Next month Coal Age's 21st Annual Model Mining Number will be in your hands. Featuring the No. 8 field of eastern Ohio, this issue will tell how one of the oldest producing districts has taken advantage of new equipment and methods to start a widespread mass movement of modernization which can easily point the way for many other coal fields to follow. Detailed operating high spots of 20 mines, worked by 15 companies, are made available in our October issue. Don't miss it. . . . **Oklahoma** shows how to modernize a thin-seam hand-loading mine, in this issue, p. 37. Equipping with conveyors, steel cars, and a redesigned preparation plant, Ben-Hur Coal Co., Henryetta, Okla., has boosted its output 30 per cent within a four-year period. Affable and efficient Gene Taylor, vice president in charge of operations, tells the story for *Coal Age* readers. . . . **Briquetting** and interest in the process do not stop at the Mississippi River. In the struggle for markets against oil and gas, Consumers Lignite Co., Alba, Texas, developed a successful method late in 1940 and had upped capacity to 592,000 pillow-shaped 2-oz. briquets per hour at the time Charlie Lambur got the story. Though Charlie

(CONTINUED ON PAGE 7)

COAL AGE (with which is consolidated "The Colliery Engineer" and "Mines and Minerals") is published monthly on the 1st. Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42d Street, New York, N. Y.

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SEPTEMBER 1941 Thirty-Five Cents Per Copy

Coal Age

Volume 46 Number 9

Contents

Magic that makes wire rope STAND UP...

...GEARS Last Longer

THE East Indian rope trick is magic that mystifies all. But here's "magic" *you* can perform, not only to make wire rope stand up, but to keep gear teeth quiet and free from undue wear.

Everywhere, wire rope and gear teeth are giving this extra service, protected with *Texaco Crater*.

On wire rope, Texaco Crater penetrates to the core, embedding each wire of each strand in a tough, viscous wear-defying film that protects against water, wear, corrosion.

On open gears, Texaco Crater clings and follows through from tooth to tooth and from gear to gear. It resists channeling, balling up and throwing off.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred also by prominent mines in every coal-producing State.

These Texaco users enjoy many benefits that can also be yours. A Texaco Lubrication Engineer will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distributing plants in the 48 States, or write:

The Texas Company, 135 E. 42nd St., New York, N. Y.

Texaco Crater resists channeling, squeezing out, balling up, throwing off . . . it clings.

THEY PREFER TEXACO

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

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TEXACO

TEXACO Lubricants

FOR THE COAL MINING INDUSTRY

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for National Defense.

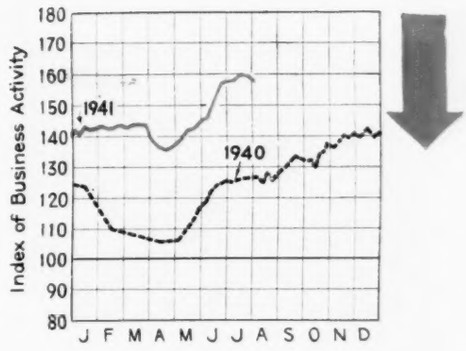
(CONTINUED FROM PAGE 5)

is now telling other type stories to engineer officer trainees at Fort Belvoir, Va., his *Coal Age* Texas story will be published in an early issue. . . . **Metallizing,** while not generally used in mine repair shops, has been practiced by several coal companies during the last few years. But the trouble has been in getting a practical story of its mining applications. However, R. Dawson Hall recently visited Hudson Coal Co., and came back with the one-pager, 45, in this issue, which tells much in few words. It's of first importance to maintenance and repair men — and mine executives should have an inkling, too. . . . **Aerial tramways** are used for refuse disposal at six New River Co. mines. The newest, at Summerlee, will soon be described by J. E. Howard, chief engineer, New River Co. In this issue, p. 50, Mr. Howard deals with details of the water-treatment plant at the Lochgelly operation, which now gives this New River town a crystal-clear drinking supply. Both articles are packed full of basic information. . . . **Michigan** has now adopted conveyors, with Big Chief mine of Robert Gage Coal Co. doing the pioneering for the field. Five conveyors averaging 9 tons per man at the face produce 27 per cent of mine output, and plans have been made to increase conveyor tonnage to 50 per cent of total production. Many changes have contributed toward increased efficiency, cost reductions and lengthened mine life. The history is found on p. 46 of this number.

HOW'S BUSINESS

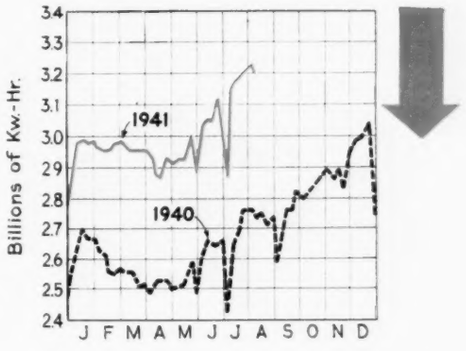
GENERAL BUSINESS CONDITIONS

Business Week Index—Aug. 16—dropped 2.3 points from the preceding week, reflecting curtailed steel operations due to scrap shortage, rationing of textile supplies, change-over in automobile production, slump in construction awards (probably only temporary), and institution of credit controls. General business expansion awaits completion of new defense plants and conversion of other plants for all-out arms output.



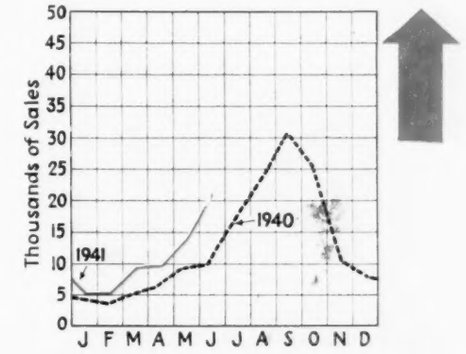
ELECTRICAL POWER OUTPUT

Production of energy by the electric light and power industry, according to the Edison Electric Institute, dipped 0.9 per cent during the week ended Aug. 9, compared with the preceding week, but was 16.5 per cent above that of the year before. The dip was in line with the trend of last year, but was partly due to strikes at defense-work plants. Output for recent weeks was: July 19, 3,162,000,000 kw.-hr.; July 26, 3,184,000,000; Aug. 2, 3,226,000,000; Aug. 9, 3,196,009,000 kw.-hr.



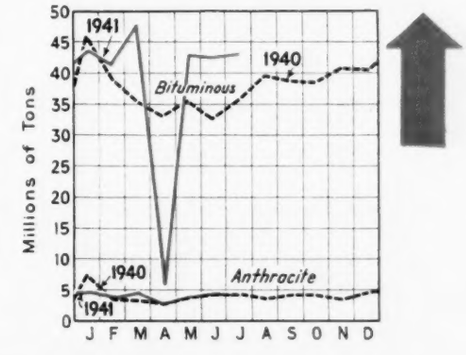
COAL STOKER SALES

Mechanical stoker sales in the United States in June last totaled 21,787 units (U. S. Bureau of the Census from 101 manufacturers), compared with 14,371 in the preceding month, 10,055 in June, 1940. Sales of small units in June last were: Class 1 (under 61 lb. of coal per hour), 20,439 (bituminous, 18,549; anthracite, 1,890); Class 2 (61–100 lb. per hour), 566 (bituminous, 534; anthracite, 32); class 3 (101–300 lb. per hour), 382.



COAL PRODUCTION

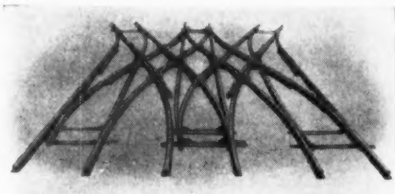
Bituminous coal produced by United States mines in July last (preliminary) totaled 43,300,000 net tons, according to the Bituminous Coal Division, U. S. Department of the Interior. This compares with 42,774,000 tons (revised) in the preceding month and 35,890,000 tons in July, 1940. Anthracite tonnage in July last, according to the U. S. Bureau of Mines (preliminary), was 4,623,000, against 4,891,000 (revised) in the preceding month and 4,534,000 tons in July, 1940.



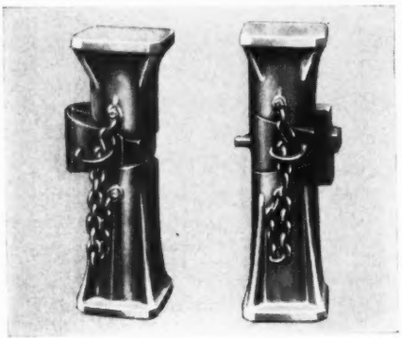
STEEL proves its mettle

. . . *by doing a better job, faster*

U·S·S STEEL TIES assure safe and rapid movement of heavy equipment. Derailments are substantially reduced, as the track is held in perfect alignment. Shallow in depth, headroom is increased. They are easily laid with few tools, and track may be moved from room to room in whole sections.



U·S·S LORAIN SPECIAL TRACKWORK has proven its reliability for over fifty years. More efficient frogs, crossings and switches speed production by reducing derailments to a minimum. These items can be made to fit your special requirements.



U·S·S COLLAPSIBLE MINE POSTS provide positive roof control, give greater security in your longwall and room and pillar operations. They are easy to remove, and easy to retrieve because all parts are chained together. As they are practically indestructible, they can be used indefinitely.

U·S·S STEEL ROOM TIMBERS pay for themselves by increasing production efficiency. Their longer spans mean fewer pit posts and allow a wider room, so that expensive cutting machines can be operated at full capacity. They are safe, too — may bend but not break.

IN these days of capacity production, steel is proving its worth everywhere in the mine. Its greater strength and durability make possible the full use of heavier, high-speed equipment.

Steel room timbers and posts increase output by enlarging the working area. Their greater strength promotes safety. Bigger loads roll out faster and safer on trackwork laid on steel ties.

And the ultimate economy of steel is being proved every day. Long lasting, it is permanent where wanted, or it may be re-used many times.

Carnegie-Illinois makes the right steel for every mine use. When you have a problem involving the use of steel, why not consult Carnegie-Illinois? We will be glad to work with you, and there is no obligation for this service.

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UNITED STATES STEEL

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Coal Age

Established 1911 — McGraw-Hill Publishing Co., Inc.
SYDNEY A. HALE, *Editor* • SEPTEMBER 1941

Pertinent and Impertinent

• DO YOUR SHARE to preserve the American way of life. Invest regularly in Defense Savings Bonds; available at more than 16,000 postoffices and 9,000 banks throughout the country.

• ROUND PEGS in square holes too frequently end up in oblong boxes six feet under the ground. Job misfits should have no place in an industry where any false move may imperil the safety of the misfit and his fellow workers.

• WAR is hell," declared General Sherman. Too bad this forthright soldier could not have lived long enough to tell what he thought of the pleasures of trying to run industry under the priority system.

• OPM suggests that manufacturers and producers specifically assign special members of their staffs to handle priority matters. With priorities becoming the biggest business of many concerns, such a step is inevitable. In fact, some companies antedated the OPM suggestion with action by several weeks.

• MECHANICAL coal stokers exhibit no slacking in their dizzy sales climb. Factory sales for the first half of 1941 totaled 67,308 units. This was an increase of 79.6 per cent over the January-June period last year and 149.0 per cent ahead of the first six months in 1939. Shipments of oil burners and oil-burning units of all sizes for the 1941 period were only 53.5 per cent over 1940. In the case of residential stokers burning less than 61 pounds per hour, 1941 sales were 85.4 per cent above 1940 and 173.3 per cent over 1939. Oil still leads in total units, but the gap is growing smaller.

• AN AUGUST SURVEY of the National Association of Manufacturers showed that 659 defense industries already had enrolled 382,876 workers in plant training courses to build up an employment backlog against anticipated shortages in skilled and semi-skilled labor within the next six months. Wonder what the coal-mining industry has to report.

• CHAMELEONS run a poor second to boosters for the St. Lawrence hydro-seaway project. In 1934, before war's alarms had shattered the world's ear drums, the proposal was rejected by the Senate. A few months ago, the project—this time wearing a national-defense mask—was again introduced into Congress. How thin that mask is has been shown by witness after witness testifying before Congressional committees. The best most witnesses not directly connected with the Roosevelt administration could say for it was that any possible defense benefits could not come for several years—and that many of these benefits long deferred were dubious. Thoroughly discredited as a defense project, it is now nestling in an omnibus rivers-and-harbors bill with a number of other slices of political pork. Descent from the high plateaus of national defense to the malodorous pork barrel, however, seems not to abash any St. Lawrence proponents.

• WASHINGTON is watching prices these days with slightly jaundiced eyes. There seems to be no disposition in responsible administrative quarters, however, to ask or expect industry to do business at a loss. But any company or industry that attempts to use the national emergency to make unreasonable profits is playing with fire—now and here-

after. Even if no price ceiling drops, possession of such gains will be short-lived. The tax collector will get the lion's share in 1942. Labor will use the earnings record as justification for further wage increases. And the company or industry will get a public black eye. Is that smart management?

Shrinking

PRODUCTION of 500,000,000 tons of bituminous coal—the estimated requirements for this year—should present no great difficulties to the industry. But some further speeding up is necessary to attain that total. The losses incurred during the spring suspension have not been fully made up. A month ago it was estimated that a weekly average of 10,650,000 tons for the rest of the year would have to be produced to hit the 500,000,000-ton mark.

Unfortunately, that average has not been maintained. By mid-August, therefore, the weekly bogey was up to 10,676,000 tons. This is not an alarming increase over the earlier figure. Any shrinkage in the margin of safety, however, is a cause for justifiable concern. So, with the Labor Day holiday behind them, buyers and producers should join in an orderly effort to lift the weekly average comfortably above the danger zone.

Lo! the Humble Stove

AUTOMATIC HEAT is so dramatic it is easy to forget that several million American homes depend upon coal- or wood-burning stoves for their winter warmth. Possibilities of modern space heaters for recovering lost tonnages attracted the interest of anthracite producers some time ago. Sinclair Coal's successful excursion into the stove field, however, probably was primarily responsible for focusing widespread attention on the older market. As a result, inventive genius and engineering research again are entering the picture.

The latest development in that direction is a program sponsored by Bituminous Coal Research, Inc., and twenty-six stove manufacturers. Objectives of the program, to be carried out at Battelle Memorial Institute, are smokeless combustion, automatic regulation and fuel capacity for twelve to twenty-four hours' operation. These are highly desirable aims. While vigorously reaching out for new markets, the coal industry cannot afford to weaken its hold on older ones. Research can serve both causes.

United Front

STREAMLINED EFFICIENCY in every activity is the present goal of progressive management. When it comes to wage negotiations, however, the industry still clings to tactics born in a horse-and-buggy era. Hours and days are wasted in desultory discussion out of deference to moldy tradition. Ear-filling figures—not taken too seriously by either side—are tossed back and forth across the conference table. And, in the end, mass organization usually triumphs over the unorganized, individualistic representatives of management at the counsel board.

The reasons for this outcome should be plain. They have been pointed out several times in these columns. But, until some positive action is taken to correct the basic situation, they will bear repeated reiteration. Labor wins most of the points it presses because it enters the conference fully prepared for the argument. Management many times yields while doubting the economic wisdom of the concessions granted. It yields because management's representatives are pitched into the negotiations without the factual data essential to reaching sound conclusions.

This situation will exist until management matches labor's resources with a fact-finding organization of its own. Obviously the wider such an agency specializing in continuing impartial study in the field of industrial relations is supported by operators, the more effective service it can render the industry. Ultimately such an organization should enlist the cooperation of every bituminous field in the country. Since the Appalachian agreement is the basic contract for the industry, it would seem to be equally obvious that the start should be made in the Appalachian region.

Theoretically, the tenuous unity of that region was destroyed this year when Southern operators withdrew from the joint conference at New York in April. Actually, as in the case of the secession in 1934, the basic agreement still held. While two separate documents were executed in both years, the secessionists' contracts in both cases gave them no more and no less than they would have had if no break had been made. So what is the good of traveling separate roads to the same destination? Especially when cooperation would strengthen both management groups?

Faithful Goat

CERTAIN seaboard industries that deserted coal for liquid fuel when oil prices crashed to low levels in the '20s may be compelled to renew their association with solid fuel this winter. "Not for long, though," gurgles one of our Washington pipelines. With a new pipeline in the offing as soon as the President gives its construction an emergency status and more tankers in coastwise service—maybe!—the Northeast may again wallow in oil. As in drought areas normally using hydro-electric power, the coal industry is called upon to do a national rescue job with the boot as its promised reward.

It is not a pretty picture. The fact that the proposed pipeline will have a carrying capacity big enough to displace 23,000,000 tons of coal annually does not make it prettier. And weeping over the prospects will not brighten them. Priorities, transportation and manpower permitting, coal, of course, will take on the added emergency load. For its future protection, however, it must increase and intensify its drive for lower production costs so that coal prices will be truly competitive with those of other fuels when the emergency is over. That is the strongest appeal the industry can make to the post-emergency buyer.

MODERN EQUIPMENT

From Face to Preparation Plant Gives New Life to Thin-Seam Oklahoma Mine

How modern methods can be applied to a thin-seam mine that formerly was hand loading is told by Ben-Hur Coal Co. During the last four years, conveyors have been installed, a new system of mining developed with 130-ft.-wide rooms, 5-ton all-steel cars installed, the preparation plant redesigned, increasing the output from four to ten sizes and from 225 to 1,000 tons per day, and enlarged from three to five loading tracks.

By GENE TAYLOR

Vice President in Charge of Operations
Ben-Hur Coal Co.

OBTAINED in 1936 with an underground haul of 1¾ miles, the Blackstone drift mine of Ben-Hur Coal Co., Henryetta, Okla., has successfully been modernized. Conveyors were installed in 1938. Haulage was modernized by installation of 5-ton cars and the preparation plant redesigned and enlarged in 1940. A 150-ton raw-coal hopper with reciprocating feeder, high-speed shaker screens, a vibrating screen and a treating system are among the improvements. Four men now operate the plant whereas nine formerly were needed.

The mine is in the 34- to 36-in. Henryetta seam. Bottom is a hard fireclay and top is 225 ft. of hard shale overlain by 3 ft. of sandstone, 62 ft. of shale, 3 ft. of sandstone and 5 ft. subsoil for a total average overburden of 300 ft. The general development plan is based on a main entry from which three cross entries—known as straight, right and left back entries—are driven both right and left at an angle of 90 deg. 25 ft. wide except the straight, which is 30 ft. Straight and right back entries are separated by a 50-ft. pillar and the left back by a 30-ft. pillar. Straight and right back entries are developed and the right-hand rooms mined on the advance; the left back entry and left-hand rooms mined on the retreat from the panel. The average panel length is ¾ mile.

Originally, a two-room system of conveyor mining was used. Now, four rooms are driven at a time. Each is equipped with a Jeffrey 61-HG chain-flight face and 61-AM room conveyor, Sullivan CE-7 shortwall mining machine, Hardsocg hand drill and 12-in. blower and tubing. Room conveyors empty into two 61-AM gathering conveyors in tandem in the back entry. These discharge onto a 61-EW elevating conveyor that loads mine cars in the straight entry. Gathering conveyors total 520 ft. in length with one section of 5-in.-deep pans that serve the two farthest rooms and the other with 7-in. pans to carry the combined load of all rooms.

The elevating conveyor is placed in a crosscut, brushed for height, opposite the pillar between Nos. 4 and 5 rooms (Fig. 1), and eight rooms are worked before it is moved. To move the conveyors to a new set of four rooms takes five shifts and 20 to 24 men. Moving to a new parting set-up requires eight shifts with the same number of men. Rooms on the down-pitch side of a panel are first worked and serve as sumps for the small quantity of water encountered.

Rooms at their mouth are 25 ft. and widen to 50 ft. when driven 40 ft. This width is maintained for a depth of 350 ft., at which point the face conveyor is pivoted on the room conveyor through 180 deg. and lengthened as coal is loaded until an 80-ft. face is obtained. This 80-ft. slab is mined on the retreat from the room, making a 130-ft.-wide place and leaving a 30-ft. pillar. Crosscuts are made only on the advance for ventilation so that a solid pillar remains between alternate rooms. Four shovelers begin a room, and by the time it is 50 ft. wide six are working. Seven are employed on the 80-ft. face.

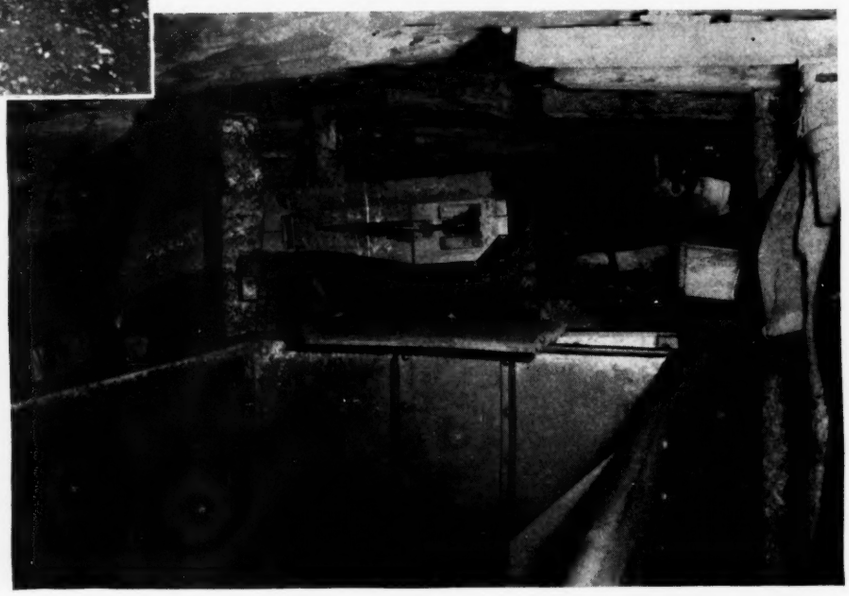
After a fall of coal the shovelers concentrate on one corner and load it out so that the mining machine can be sumped, and it then follows the shovelers across the face. The bottom is hard, so undercutting is in the seam by 6-ft. bars with Stoodite-tipped bits. Machine men set sprags on 8-ft. centers and also pull the conveyor to within 2 ft. of the face.

In a 50-ft. face three 2-in. holes are drilled at the top of the seam and loaded with one stick of Hercules permissible powder in the center and two sticks in the corner holes. In an 80-ft. face two holes are made at the top—one at the solid corner and one 25 ft. from it. Two sticks of powder are used in the corner and one in the other hole. Each is fired singly by an electric blaster.

Timbers, 5 to 7 in. in diameter, are taken to the face on the room conveyors by reversing their direction of travel and are set on 3-ft. centers with safety props at the face, and are not retrieved. Natural ventilation is maintained by crosscuts and curtain. A new air and escapeway 45-deg. slope is being completed with a 5-ft. Aero-

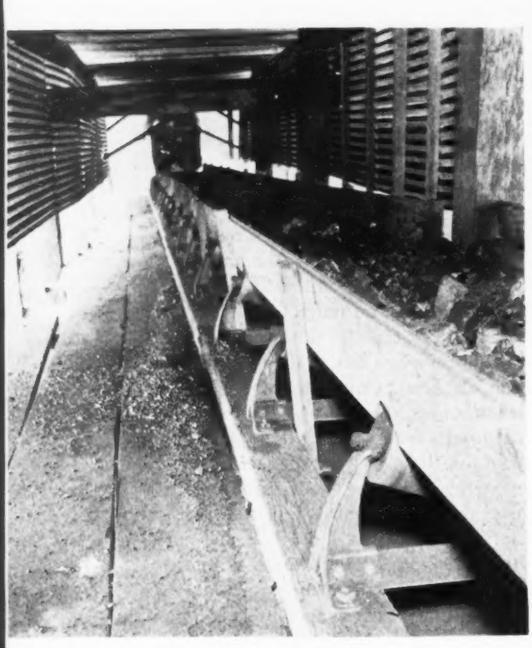
The 36-in. seam is loaded onto chain-flight face conveyors in room work.

An elevating conveyor loads all output into 5-ton all-steel automatic drop-bottom cars which haul to the preparation plant.

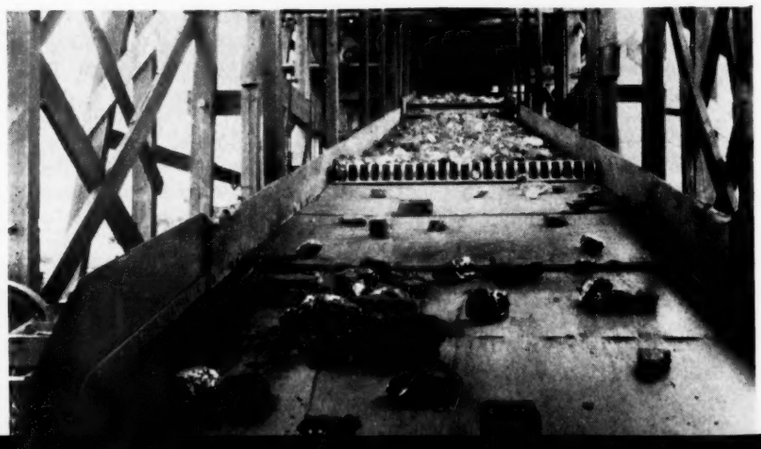


Cars empty into a 150-ton steel hopper.

Haulage is 2½ miles underground and ½ mile outside in trips of eight cars.



A 30-in. belt conveyor 80 ft. long carries coal from the hopper to the main shaker screens.



Primary sizing is done on 38 ft. of 5-ft.-wide shaker screens.

dyne fan at its bottom. The present surface fan also will be used.

Haulage is by 30 Sanford-Day 5-ton all-steel 1-2-3 automatic drop-bottom cars, which displaced 115 1½-ton wood cars, and are spotted at the elevating conveyor by a Brown-Fayro HKL hoist with pushbutton control at the loading point. The cars have 18-in. S.D. floater, ball-bearing, demountable, chilled-tread wheels. Axles are 3¼-in. and rail clearance is 2¼ in. Bodies are 13 ft. 9 in. long, 5 ft. 3 in. wide and 38 in. high. They are ⅜-in. plate with ¼-in. end plate. One end has a spring bumper. The parting holds twelve loads and trips of eight are hauled over 40-lb. rail 2½ miles underground and ½ mile outside to the preparation plant. One 6-ton locomotive for gathering and two 8-ton units for main haul are in use. However, trips will be enlarged and 12-ton locomotives installed on the main haul.

Drive With Conveyors

Straight and right back entries are driven on sights at the same time by Goodman G-12½ shaker conveyors with a chain flight conveyor across the face of the straight entry. From 300 to 350 ft. is driven on one set-up. The shaker drives are placed in 1-ft. holes and have an adjustable stroke of 4 and 9 in. With the short stroke the pans have been extended 565 ft. before moving up. The straight-entry conveyor is along one rib and loads directly into mine cars by a curved shaker pan. The back-entry conveyor discharges into a chain conveyor placed in a crosscut and loads mine cars in the straight entry. The shaker-type conveyor is particularly good on development, as the telescope pan makes it easy to move.

Props of 5- and 7-in. diameter are set on 3- to 5-ft. centers; in the straight entry a double row is placed 10 ft. apart where top is to be taken. After the coal is loaded out and the shaker moved, the top is brushed 3 x 10 ft. wide except at partings, which are 16 ft. wide and 320 ft. long. For brushing, four 6-ft. holes are drilled in the face of the rock to be taken—two side holes 18 in. up and two corner holes at the top of brushing. Each is loaded by three sticks of permissible powder and the bottom two are fired first. This gives a total clearance of 6 ft. All rock is gobbed except at partings, where about one-third is loaded out. Three-piece sets on 5-ft. centers are set where entry top is taken. The total crew for each entry is four men, who do all work, and an additional man spots cars at the loading point.

Besides a conveyor each entry unit includes a shortwall mining machine, Chicago Pneumatic electric drill and 12-in. fan and tubing. Undercutting, drilling and shooting are the same as for a 50-ft. room face.

115 Men Employed

The average number of underground men per day shift totals 44, including: 28 shovelers, 6 machine men, 2 car spotters, 3 motormen, 1 electrician and 1 helper, 1 timberman, 1 tracklayer and a face boss. Room and development work is done on the two day shifts and only development and maintenance on the night shift, which employs 16 men and a boss. Total employees per 24-hour day average 105 underground and 10 outside, including foremen and a superintendent.

Mine cars dump into a 150-ton steel hopper equipped with a Jeffrey 48-in. reciprocating feeder loading at the rate of 80 tons per hour onto a 30-in. 80-ft.-long Goodyear belt which discharges onto 5x58 ft. of shaker classifying screens. These are combinations of bar, round-hole and step screens. The step screens are designed and made at the mine. Typical output for a domestic run is 5x2½-in. egg, 2½-in. lump, 2½x1¼-in. rescreened nut, 1¼x$\frac{13}{16}$-in. chestnut and minus $\frac{13}{16}$-in., which passes over a Jeffrey-Traylor single-deck vibrator screen that makes $\frac{13}{16}$x$\frac{7}{16}$-in. domestic stoker and minus $\frac{7}{16}$-in. slack. Nut and chestnut are rescreened and the undersize is loaded with the slack. It is planned to pass the rescreenings over the vibrator. All screens are bolted down and can readily be changed to make 5-in. fancy lump, 5-in. mine-run, straight mine-run and 5x1¼-in. egg-nut, for a total of ten sizes.

Dustproof With Oil

All domestic stoker is vapor oil-treated at 400 to 450 lb. pressure by a Brown-Fayro system. Chestnut, nut, egg-nut and egg may be oil-treated at three different loading points by specially designed spray boxes. Oil is stored in a 12,000-gal. tank. Two tracks are loaded by booms, one a belt and the other a chain-flight type. A 24x48-in. adjustable single-roll crusher is being installed to crush any size.

Average output per shift is 500 tons, or 1,000 tons per day. The high-track capacity is 40 and the low-track 50 cars, which are dropped by gravity with a 2½ per cent grade at the plant. Coal is loaded on five tracks served by the St. Louis-San Francisco Ry. Four men operate the entire plant. Rock from underground is wasted on a dump by a 6-ton steel automatic side-door dump car. All motors are 220-volt a.c. except on the vibrator, which is furnished 15 volts d.c. by a small motor-generator set operated by a 2½-hp. motor. Total plant horsepower is 142 and the largest motor—on the rock car hoist—is 52 hp. Power is purchased and metered at 2,300 volts a.c. and transformed to 220 volts. Two 150-kw. d.c. generators, one at the bottom of the new slope and one at the drift mouth, furnish 250 volt d.c. for haulage. Trolley wire is No. 4/0 on main line and 2/0 in the working section, where it is sectionalized by a manual circuit breaker. All other equipment is powered by 220-volt a.c. brought down a drillhole by a 350,000-cir.mil cable which has a fuse at the top and bottom. These drillholes are on 1,250-ft. centers and the cable is moved to keep up with the mining. An unusual feature is the maintenance of Bell telephone service to the underground, and the phone box is moved up as each new section is opened.

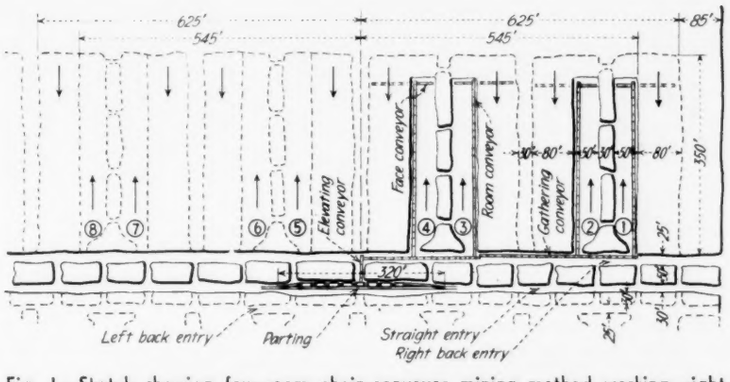


Fig. 1—Sketch showing four-room chain-conveyor mining method working eight rooms from one parting. Two entries and one side of panel are mined on the advance. Development is by shaking conveyors.

200 TONS WITH 14 MEN

Average Output at Streeter Mine Using Shuttle Cars Made From Dump Trucks

Using one loading machine and two shuttle cars made by installing electric motors and cable reels on standard end-dump trucks, a mine force of 14 men produces 200 tons in two shifts at Streeter mine. Shuttle cars haul from face to tipple. Working height is 14 to 16 ft. The coal is cut with patent bits and broken down with carbon dioxide. Safety measures and equipment include sprinkling, hard hats and shoes, goggles and electric cap lamps.

By IVAN A. GIVEN
Associate Editor, Coal Age

USING two trolley-and-cable-reel shuttle cars made from standard 1½-ton dump trucks for the entire underground-haulage job, the Domestic Coal Co., Axial, Colo., operating one loading machine, produces an average of 200 tons per day of two shifts at its Streeter mine with a total force of 14 men. Part of the output is sold to trucks at the tipple, but the major portion is hauled under contract 28 miles to two rescreening and loading stations at the rail head at Craig, Colo.

Streeter mine was the second in Colorado to install a "Junior" Cardox shell-charging plant. Employees wear hard hats, safety shoes, goggles when picking, chipping, etc., and Edison electric cap lamps. The coal is cut with Cincinnati "Duplex" chain and bit equipment, and the cutting machine is fitted with a hose attachment to apply water to the bar. The mine piping system also supplies water for sprinkling haulage roads and working places as required.

The property originally was opened in 1920 by the Streeter Coal Co., and was planned as a good-sized operation with a rail connection. However, this did not materialize and only a little entry and a few rooms had been opened up when the Domestic Coal Co., headed by George C. Watson, took over in 1937. Edward C. Shipley, Jr., is now foreman and resident manager, with Ben Benham in charge of maintenance and electrical work. Power-plant operation and certain other top duties, including weighing, are in the hands of M. M. Gates on the first shift and R. G. Henderson on the second.

In the early stages of its régime, the Domestic Coal Co. continued the hand loading and horse haulage originally practiced but immediately began a study of the possibilities of mechanical operation. The first step, in 1937, was installation of an old-type Eickhoff shaker conveyor with self-loading head. Edison cap lamps were adopted in 1938, and in July, 1939, the company acquired two Joy 5BU loading machines which had been traded in by the Bell & Zoller Coal & Mining Co., of Zeigler, Ill. One machine was placed in service and the other kept on hand as a source of spare parts and assemblies. Mine cars were retained but were handled between loading machine and outside by an underground hoist. Cardox coal-breaking was adopted in August, 1939, shortly after the arrival of the loaders.

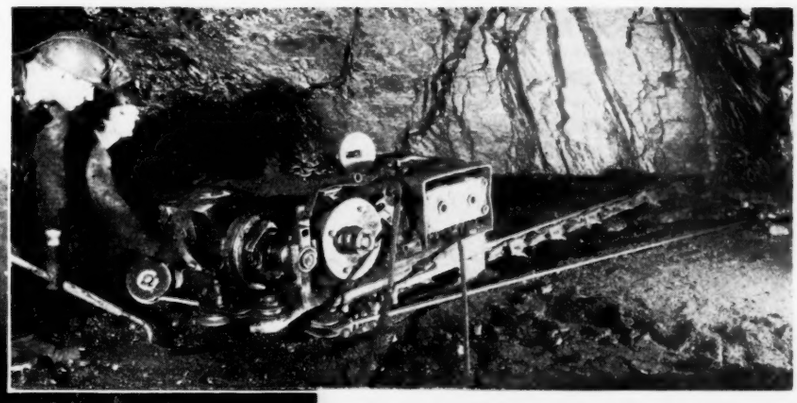
Handling haulage with a hoist was at best rather unsatisfactory and in addition was limited in application. In the search for a better haulage medium, the idea of making shuttle cars or "buggies" out of dump trucks was hit upon. The first was built in July, 1940, and proved so successful that work was started immediately on a second and it was completed in August. The trucks were standard 1½-ton end-dumping units, dumping being effected by hydraulic hoists. The engines were removed and 15-hp. 250-volt General Electric motors with Goodman pancake resistances and reversing type controllers were installed. No changes were made in the truck transmission, meaning that the original clutch, gear-shift and hoist control are available as desired.

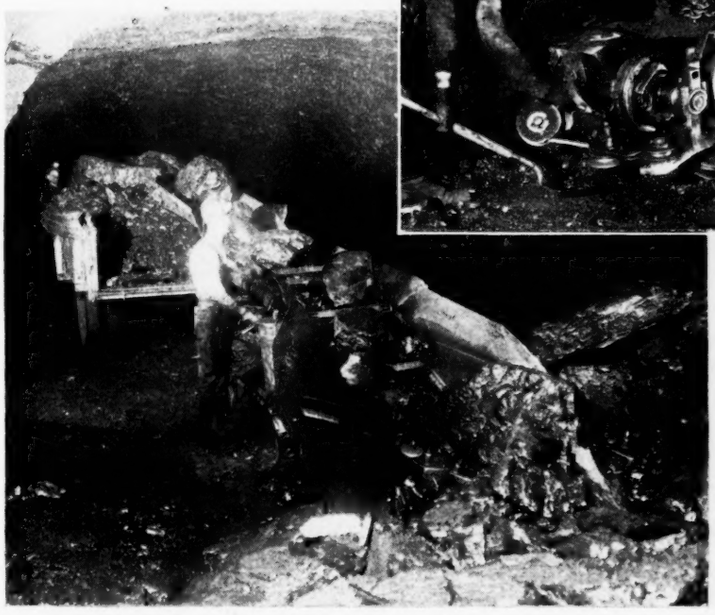
The cabs were taken off the trucks and a vertical steering post and a step for the driver to stand on were installed. A hand-operated reel with a capacity of 400 ft. of rubber-covered parallel-duplex cable was installed over the motor in each buggy. Reel and frame may be lifted off by loosening three bolts on each side, thus providing free access to the motor. Capacity of one of the buggies is approximately 7 tons; of the other, 8 tons. As plenty of height is available, the bodies were left in their original state. In other words, lowering them was not required.

Power is supplied to the buggies by an overhead trolley system consisting of a trolley-wire positive and a wire-rope negative placed side by side. A glider-type current collector slides along on top of the two wires and on the main line is pulled along by the cable. When a buggy goes into a room or other working place, the glider stays in position at the end of the wire and the cable is paid off the reel on the buggy.

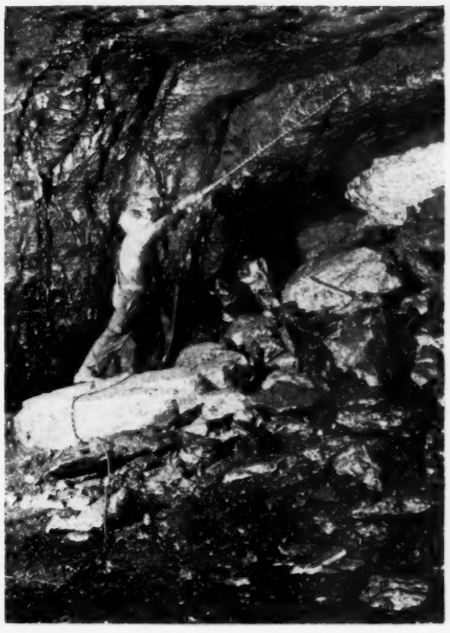
The buggies back in to the loading machine, then come out, execute a quarter turn and back out to the tipple. At the loading machine, the

The cutting machine at Streeter is equipped with a bar accommodating patent bits.

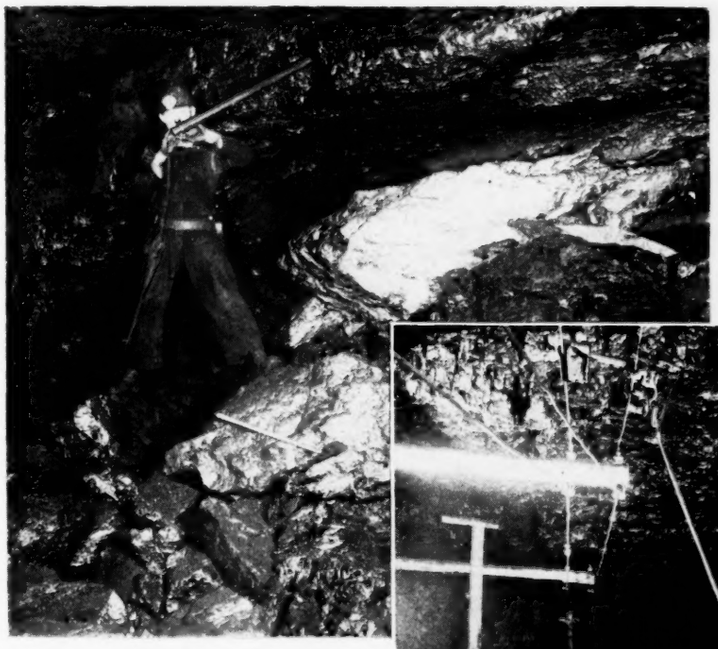




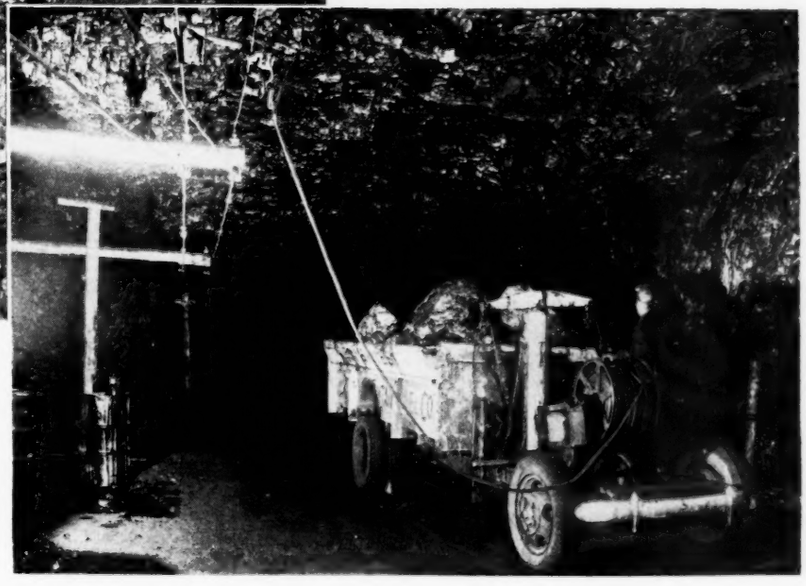
Loading machine putting 7-ton cargo on one of Streeter buggies.



Drilling a hole in the upper round after the bottom bench has been broken down and thrown out.



Loading a hole with carbon-dioxide-filled tube.



Buggy headed for the outside, pulling its trolley (upper left) after it.

transmission is left in first, or low, gear and the unit worked back and forth as necessary by reversing the motor. On the way to the tipple, second gear may be used. On the return empty it sometimes is possible to operate in third gear. At the tipple, the body is raised to dump the coal directly onto the shaker screen.

In addition to the screen, the tipple includes a crusher for breaking lump to a top size of 6 to 8 in. for making nut and other smaller sizes when lump demand is down. The crushed coal is returned to the screen by dump truck. Storage and loading bins are provided for ¼-in. slack, ¼ x 1¼-in. stoker, 1¼ x 3-in. nut and 3-in. lump. Choice lump is made by picking the chunks out of 3-in. lump and returning the smaller coal to the screen. By the proper changes in plates, it also is possible to make a 3 x 8-in. grate. Plans have been made for the installation of equipment for oil-treating stoker and slack. At the rail head at Craig, one loading station handles lump, which is passed over a degradation screen and placed in box cars by hand. A second station, with rotary screen for removing degradation, takes care of nut or stoker.

Power for operation of the mine was provided by the installation of a Scotch marine boiler (rated at 120-lb. gage and fired with slack) and an Ideal engine hooked to a Westinghouse 400-amp. 275-volt d.c. generator.

Collum Seam Mined

Streeter mine recovers the Collum vein, averaging some 25 ft. in thickness under 200 to 300 ft. of cover. Underneath the coal is a hard fireclay. Over it is sandstone. The seam pitches about 5 to 6 per cent southwest. While a few rooms are being completed at the present time, work is being concentrated on driving to the boundary, whereupon a full-retreat system will be adopted. In rooms now being worked, about 5 to 10 ft. of top coal is left, and breaking is conducted so that this top coal forms an arch, thus providing maximum roof strength. In the future, the plan is to drive the rooms about 14 to 16 ft. high and then break down the top coal to the sandstone to complete the job.

The present main entry is made up of two headings 22 ft. wide on 80-ft. centers. These headings are driven 14 to 16 ft. high. When they reach the boundary, the buggy haul will be approximately 2,000 ft. Rooms then will be turned both ways and mined out on the retreat. The practice will

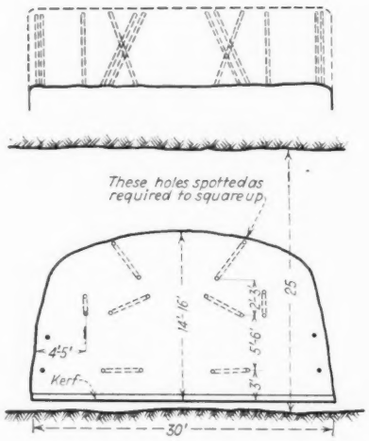


Fig. 1—Drilling plan for 30-ft.-wide room, carbon-dioxide shooting, Streeter mine.

be to drive a pair of 30-ft. rooms 300 ft. deep on 70-ft. centers on each side of the main entry. When these are completed, the machine will drop back to the next pairs, separated from the others by 70-ft. pillars. In preparation for this, rooms are being necked 22 ft. wide and driven in about 50 ft. as the new entry advances.

The coal is undercut by a 35-hp. Goodman standard shortwall with 8-ft. Cincinnati bar and "Duplex" chain and bits. Pending construction of a truck from the spare 5BU cats, the machine is dragged from place to place by the larger buggy.

Drilling is done with Black & Decker hand-held units, using Hardsocg twisted augers, heads and bits. Hole diameter is 2½ to 3 in. The typical drilling pattern for a place 30 ft. wide and about 15 ft. high is shown in Fig. 1.

Drilling and breaking are done in several stages. In the first stage, the bottom bench is brought down by two buster holes angled toward each other to throw out the center section of the lower bench. Then the rib holes are fired to make way for the next round, consisting of two angle holes in the middle and two more holes about 4 to 5 ft. from the rib.

Sometimes, this finishes the breaking operation, but normally two more holes drilled still higher are required to square up and bring down the rest of the coal to the desired height. The location of these holes is varied as conditions warrant. Thus, the usual 30-ft.-wide place making some 90 tons is broken with twelve Cardox 2-100 tubes, each tube (110-gram heater, No. 14 disk) loaded with 3 lb. of carbon dioxide. In 22-ft.-wide headings, the drilling plan is substantially the same, except that the rib holes between the bottom and second rounds are eliminated. Holes normally are drilled about 6 in. shorter than the depth of the cut. In January, 1941, Streeter shipped 65 per cent of its output as 3-in. or larger.

The standard crew on the day shift is made up as follows: one loader operator; one helper, who brings in an empty buggy from the mouth of the place, maneuvers it during loading and returns it to the haulage heading, where he exchanges it for an empty, in addition to doing other work as required; one main-line buggy runner; one cutting-machine operator; two drillers and shooters, who help with cutting and do other work as required, such as sprinkling; one tipple operator; one power-plant engineer, who also weighs coal and charges lamps and Cardox tubes; and one electrician. At night, the force is made up of a loading-machine operator, helper, main-line buggy runner and engineer. Mr. Shipley, the foreman, brings the total for a day to 14. As stated previously, such a force averages 200 tons per day in the winter season. The best day to the end of February, 1941, was 250 tons; the best single shift, 150 tons.

Streeter preparation plant.

[SECOND OF A SERIES OF ARTICLES ON HUMAN RELATIONS AND PERSONNEL BUILDING IN THE COAL-MINING INDUSTRY]

JOB ANALYSIS

To Determine Man's Fitness to His Task Essential in Successful Job-Training Program

Job misfits—the round pegs in the square holes—cost money and sometimes human lives. But how can you properly train men for a job until the job itself has been clearly analyzed? Each mining task calls for a special combination of physical, mental and emotional qualities. If the man on the job does not measure up, who is to blame?

By O. G. VAN CAMPEN
Consultant, Industrial Relations

THE greatest contribution made by the machine to the coal industry is not lowered costs; it is the constructive effect upon management. The machine is driving the mules out of the mines—and out of the front office.

Whenever a cutting machine sumps into the face, it isn't just cutting coal. It also is cutting away old hidebound traditions that have handicapped the industry for years. Whenever the loading head of a machine is moved up to a pile of slate, it isn't just loading out slate. It also is loading out the prejudices, the wrong thought habits, and the mistaken points of view which have so long been characteristic of old-line management.

The machine and its related equipment is lifting the coal mine to the higher level of a modern industrial plant. It is demanding executives of a higher type—men with keen analytical minds, far-sighted men who can think creatively, dynamic men who can energize the working force. It is demanding new techniques of management that can keep pace with technological development — exact techniques that can plan effectively, progressive techniques that are in line with the scientific development of supervision.

Machine Cuts Accidents

The machine is reducing accidents, saving lives, and creating increased opportunities for skilled workers. Its influence is being felt throughout the industry, whether the mines are operated with hand loading or mechanical equipment.

In order to realize the maximum possibilities of the machine, management has set for its immediate objective the coordination of men, management and machines. As J. B. Morrow, president, Pittsburgh Coal Co., said: "Our problem—and it is very acute—is to keep men and machinery working in harmony . . ." (*Coal Age*, April, 1941, p. 55). This, of course, is a vital problem. Coordination of men and machines is essential if minimum costs are to be realized. But, is it the fundamental problem?

Is not the real problem stated further on in Mr. Morrow's article where he says, in effect, "men are required who understand the machine —men who can ask for and receive from their gang the properly timed effort—men with a knowledge of ventilation and drainage, mining laws, mechanics, and human psychology"?

Is not the fundamental problem, therefore, a man problem—the problem of selecting the right man for the machine?

Much has been said and written about coordinating men and machines —too little about coordinating the right man and the right machine. Considerable attention is being given to the training of human hands and human minds which are to operate machines, but not enough consideration is being given to the training of the right hands and the right minds to operate machines.

Why Job Misfits?

Why attempt to train the untrainable? Superintendents and mine foremen the country over can cite case after case of supervisory headaches that result from the continuous strain of trying to train and to keep safe what might be called "job misfits."

Accident prevention is a revealing approach to the question of putting the square peg into the square hole (the round peg in the square hole is a dead man) since so many accidents are caused by job misfits. In order to fully appreciate this point let us set up a few hypothetical cases such as those frequently worked out in foremanship training.

1. Joe Blank was made front-end man on a loading machine. He was 5 ft. 7, weighed 185 lb., wore a No. 12 shoe. His body movements were generally on the slow side. He was noticeably slow in "catching on" to instructions. *Should Joe have been given such a position?*

2. Bill Blank was made a loading-machine operator. It was known to friends that Bill was moody and had a tendency to worry. He had a wife who was continuously "riding" him about something at home. He was a likable chap and had many friends in the mine who were always ready to help him get ahead. Bill did not ask for the job, but was strongly recommended by an associate operator who wanted to help him. Dur-

ing his training period it was noticed that he ran the machine in second gear while "tramming" for a longer time than was necessary. *Was Bill afraid of the machine, and did his temperament make him unfit for this type of job?*

3. Mike Blank has operated a loading machine for six months. He is the kind of a chap that everybody calls "a grand guy—but a little 'cocky'." He learned how to operate the loading machine very quickly. He was always very eager to "go to town with it." On several occasions the assistant foreman noticed that Mike would take his hands off the controls and run alongside of the machine for a bit. When cautioned, Mike said, "Aw, nuts! I can stand that old machine on its head." *Should Mike be taken off the machine and given another job?*

4. Ed Blank is being given instructions in how to operate a power drill. He has been at it for three days. Nearly every time he sets the drill on the bar he has to "wiggle" it up and down before he gets it set at the proper level. Quite frequently he drops the drill as he tries to set it into the chuck or he drops a section of the drill when adding it in. *Is Ed a fumbler, and should he be assigned to some other job?*

Who Is Responsible?

The square peg in the square hole is definitely the responsibility of management. A worker who is constantly fighting his job or himself will sooner or later be fighting his supervisors. Job misfits cause high cost, labor trouble—or serious accidents.

Even more destructive is the undermining effect of poor selection of men when it occurs in the appointment of men to supervisory positions. The morale of an entire mine is "shot to pieces" because the superintendent or general mine foreman is not big enough for his job. Sections of a mine fall below standard because the assistant mine foremen are job misfits. The old axiom that "an organization will inevitably reflect in its performance the attitudes and standards of the men at its head" is emphatically true in a coal mine.

Great care is used in buying a machine. Top management will seldom, if ever, buy a machine unless they thoroughly understand it. Management wants to know all about the parts of a machine, why and how the machine works, and how long it will stand up. The performance of the machine is carefully studied. Only after prolonged and painstaking analysis can management be convinced that the machine will do the job for which it is to be bought.

When all is said and done "a man is a machine for doing work." Like a machine, he is put together in a certain way. His mind and body working together form a unit that is fitted to do specific things. Man, like a machine, can perform best under certain conditions. And yet a man is placed in a certain job as the result of vague, intangible hunches, on snap judgment, or on a basis of "likes and dislikes."

The first step in fitting a man to a job and in maintaining standard performance is to make a comprehensive and detailed study of the job itself. This study of a job and the working conditions surrounding it is called "job analysis." All too frequently executives think of job analysis as merely a description of the duties and responsibilities in a job. While these factors are included, job analysis goes much further than this. When thorough and complete, the study of a job should result in a

description of what the worker actually does in doing the job, and the skills, abilities, and capacities the worker must possess in order to be fitted for the job.

Generally speaking, job analysis can be classified into four types: (1) For selecting and promoting employees; (2) for development of better safety practice; (3) for development of better ways of doing the job; (4) for the development of training methods. Discussion here will be limited to the first classification: "For selecting and promoting employees."

What the worker actually does in operating a machine, using tools and materials, etc., are called "job specifications." The skills, abilities, and capacities which the worker must possess are called "man qualifications." These two aspects are combined in a complete job analysis. Opinion varies as to the actual items to be included in job analysis. The following list is merely suggested:

(1) Identification of the job;
(2) Description of equipment or functions;
(3) Description of performance;
(4) Working conditions;
(5) Description of hazard;
(6) Length of training period;
(7) Required job knowledge;
(8) Educational requirements;
(9) Required intelligence level;
(10) Degree of manual skill;
(11) Required mental traits;
(12) Degree of emotional balance;
(13) Physical and health requirements;
(14) Responsibility.

In drawing up a job analysis form, each item to be included in the analysis should be expressed in what the psychologist would call "behavior sentences." This is particularly necessary when listing mental and emotional qualities. Such terms as loyalty, patience, tact, perseverance, should be translated into concrete sentences describing the behavior of an employee that leads to such characterizations. To be of practical value, job analysis must transfer the emphasis from the possession of a particular ability or trait to the action (behavior) that expresses that attribute. In short, the items included in job specifications must be only such items as can be definitely observed.

Basic to Coordination

Two kinds of information are essential if men and machines are to be coordinated. First, there must be available a considerable amount of knowledge concerning the requirements of each job. Second, there must be available an even greater amount of information regarding the qualifications of individual workers. Production-line operating techniques require not only the coordination of men and machines but the integration of man with machines. Training programs, if they are to be productive, must be built around job performance and job requirements. Victory in the battle of fuel must inevitably go to the organization in which the right man has been properly trained for the right job.

[The third article in this series will be published in the November issue of Coal Age.]

HUDSON COAL CO. BUILDS UP

Shafts, Impellers and Other Parts By Spraying Metal on Roughened Surfaces

By R. DAWSON HALL
Engineering Editor, Coal Age

METAL surfaces are being sprayed with metal, or "metallized," by the Hudson Coal Co. at its Providence repair shops in Scranton, Pa., so as to build up worn or otherwise depleted surfaces. Metallizing is being applied to pump impellers, pump impeller rings, frame heads for electric motors of locomotives, but mostly for shafting. Some industrial companies are using it for turbines, but thus far the Hudson company has not had occasion to metallize for this purpose.

Several metals have been applied by this system of spraying, but the Providence shops have used only stainless steel, high- and low-carbon steel and bronze. The material is fed mechanically to a small spraying tool or gun in the form of ⅛-in. wire which is supplied and used in a small roll. The tool, with a pistol handle, can be held in the hand if so desired, and it may be necessary to do so where the parts to be coated are difficult to approach. Acetylene from a holder at 15 lb., oxygen at 17 lb. and air at not less than 50 lb. per square inch and not more than 75 lb. is fed to the emerging wire and ignited.

The intense heat causes a brilliant discharge of metal at a yellow heat which is not sufficient to set fire to anything or burn the hand, so fine is the spray. If the pressure of the air is rightly regulated the chuck will not get hot, and the emerging stream and shower of sparks can be viewed with the naked eye without fear of injury.

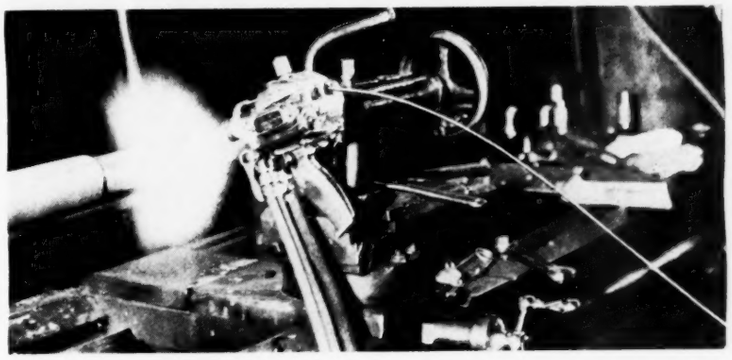
On a recent visit to the shop, a small armature shaft that had become worn was being brought back to standard dimensions by use of a gun made by the Metallizing Engineering Co., but first 1/32 of an inch was taken off on a lathe all around the shaft by a cut 1/32 in. deep. After this was done, the surface of the shaft was made rough by cutting a 60-deg. thread on it so as to give 24 threads to the inch each about 1/64-in. deep.

Then the Metallizing gun was mounted on the tool holder 4 to 6 in. away from the shaft, and the spray was put into operation, throwing a few sparks 10 or 15 ft. from the gun, but delivering the body of the metal on the periphery of the shaft. The lathe spindle and the shaft under repair were rotated while the tool rest carried the gun along the shaft and built up an even coat on it.

Because of the fineness of the spray and its relatively low temperature the shaft does not become heated. Accordingly there is no distortion. It is never necessary to hammer the metal or peen it to relieve strain caused by unequal expansion.

Despite the shower of infinitesimal slag meteorites, the lathe attendant can use his calipers to see how heavy a coat is being put on the face of the metal. In this case, he was seeking to put on a coat 1/16 in. thick to provide for the 1/32 in. he had taken off and to add as much more, so that he could remove the latter in the lathe and be sure of getting a shaft everywhere of standard diameter. The thread makes the coating adhere to the shaft. If by any chance the attendant's hand is covered by the spray it is not burned.

Before, when a shaft became worn, it had to be "junked"; now it can be built up to its former dimensions and will then give entirely satisfactory service. Where high-carbon steel is used the piece cannot be brought to the required size by turning in the lathe, but to remove excess metal it has been ground. For instance, a steel containing 0.85 per cent carbon was used for metallizing and returned to standard dimensions by the use of Carboloy. The pressure of air that gives best results is 60 lb. Air runs the motor and blows the metal and the oxygen takes care of the combustion. The Providence shop first adopted this technique during the year 1939.



Metallizing motor shaft with metal spray gun mounted on tool holder of a lathe.

MICHIGAN MINE

Successfully Pioneers Conveyorization

Upping Output Per Man at Big Chief No. 10

Conveyor mining, generally accepted in most thin-seam districts, now has entered the Michigan field. Cutter bars have been lengthened from 6 to 8 ft.; room centers increased from 36 to 50 ft., width from 25 to 40 ft. and depth from 150 to 200 ft.; brushing 10 in. x 5 ft. of room bottom and laying room track eliminated, and time of driving decreased from 7 months to 1 month. These and many hidden savings have reduced costs, increased efficiency and lengthened life of the mine.

By CHARLES LAMBUR JR.
Assistant Editor, Coal Age

OPENED in 1934 as a hand-loading operation, Big Chief mine, Unionville, Mich., Robert Gage Coal Co., now has pioneered successful conveyor development for the field. Undeterred by an unsuccessful start in 1936, conveyor mining was resumed late in 1940. This spring saw 27 per cent of the tonnage mined by five conveyors averaging 9 tons per man at the face. Plans are to increase the percentage to 50. Average output for the mine as a whole is 1,000 tons per shift.

Big Chief works the lower 36- to 52-in. seam of the Michigan series, which is splinty in character (*Coal Age*, September, 1935, p. 361). In many places the seam is dirty and contains clay veins, sulphur balls and calcite. Bottom is either fireclay or a sandy shale. At the base of the seam a layer of "blackjack" varying up to 4 in. thick generally occurs; at the top there is frequently a layer of dirty coal up to 7 in. which when left in place makes a hard strong roof. Immediately over the seam is a 0- to 12-ft. stratum of gray slate and over that a rotten gray shale. In places the top holds well but cannot be depended upon and changes without apparent cause. Cover averages 200 ft. and hoisting distance is 300 ft.

The seam occurs in meandering fingers developed by main entries running roughly north and south and cross and butt entries with rooms turned on 90 deg. and worked on the advance. Main entries are two headings 5 to 7 ft. wide on 32-ft. centers with breakthroughs every 60 ft. Track is 35-lb. on wood ties and is laid in both entries with crossovers every 300 to 600 ft. Gage is 36 in. Main-haulage timbering is 35- to 60-lb. rail hitched into the ribs on 30- to 54-in. centers. A Goodman 6-in. hitch drill is used. About 30 in. of bottom is lifted to give 5 ft. of clearance, which rock is hoisted to the surface.

Butt headings are 11 to 15 ft. wide with a 5-ft. roadway next to the rooms and 4½ ft. clearance is made by taking 20 in. of bottom which is gobbed on the bench of the entry. Timbering is 3x8-in. sawed oak and elm crossbars on 5- to 25-ft. centers with one end hitched into the rib and the other set on a road prop. A double row of split props is set on the bench. Double crossbars or rail are set where needed. Haulage here is over 20-lb. rail.

In conveyor work each room is equipped with a shortwall mining machine and 8-ft. bar and 9-position chain, an electric drill, a Jeffrey 61-AM chain flight conveyor and a Jeffrey 12-in. blower with duPont "Ventube." A crew of four men drill, load and set props. Rooms are on 50-ft. centers, 40 ft. wide and 200 ft. deep. Three to five holes are drilled per face and loaded with one and one-half to two sticks of duPont pellet powder per hole. The conveyor is placed down the center of a room and protected by props and discharges in the entry into 2,100-lb.-capacity 10-in. cast-steel-wheel wood cars. They are dropped to the loading point by gravity or spotted by a hoist.

As in all new methods of mining, intelligently supervised experiments were necessary and in this case resulted in a 40-ft.-wide room. A 55-ft. width would not hold. There is no definite schedule as to where conveyors are to be used because of the varying top condition. Top is closely watched and where good the conveyors are installed. In some sections of the mine entire panels may be worked and in others only single rooms. Sometimes roof becomes bad after a room is started and then the conveyors are removed. Even so, their use is asserted to be the salvation of the mine through their many reductions in operating costs.

No bottom is taken in the rooms; larger places and greater extraction of coal are permitted; working places are concentrated in a small area; there are no frogs, track or ties to be laid, and the miners' work is lightened. It takes about a month to complete a room, as compared to seven months by hand loading into cars. Butt entries have been increased from 300- to 400-ft. centers.

Only those rooms with top considered too bad for conveyor work are mined by hand loading into cars, so that timbering is essential. It usually consists of three-piece sets of 3x8-in. crossbars which often are made double and on from 2- to 5-ft. centers with stringers between sets. One miner does all room work except under-

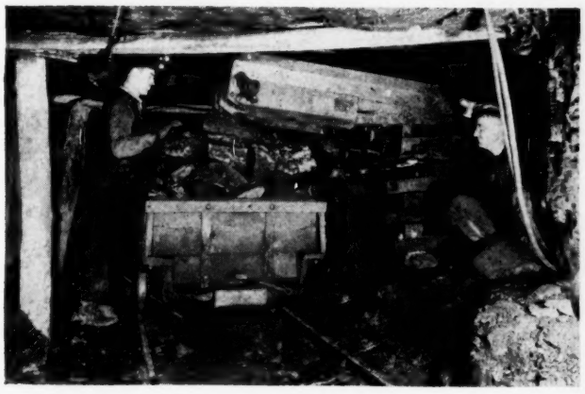
cutting. Average timber cost for the mine for ties, props, etc., is 35c. per ton, which does not include an installation charge of 6c. per ton.

To brush bottom it is drilled by a self-propelling Sullivan A-DC-8 portable air compressor and JA-45 jackhammer and detachable Timken bits. It is broken by 40-per-cent dynamite and an average of 90 cars of rock is hoisted per day. The average trip of coal is 20 cars and totals 900 per day, hauled 1 to 1½ miles by 6-, 7- and 8-ton locomotives.

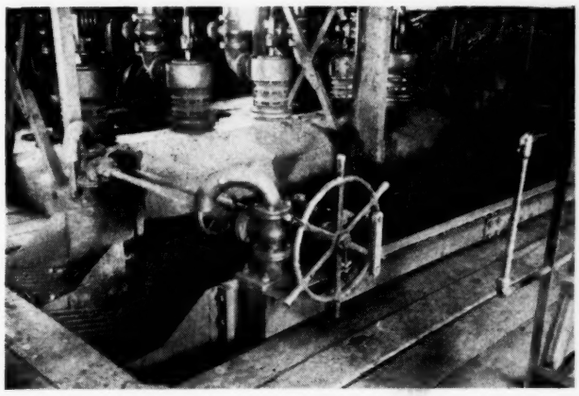
Except for a 150-kw. motor-generator set using purchased power, the company makes its own power by a Westinghouse 1,250-kva. steam turbine generating 2,300 volts a.c. which operates two motor-generator sets, one 150-kw. for surface and another 300-kw. for underground power, each making 275-volts d.c.

Total production is prepared in a three-track Link-Belt plant which washes all minus 1¾-in. in a Simon-Carves 100-ton-per-hour box. Output consists of 4-in. and 1¾-in. lump, 4 x1¾-in. egg and minus 1¾-in. washed screenings. Truck-loading facilities are available for lump and egg in separate 100-ton bins and is 50 per cent of the yearly tonnage. Treatment is by John Bean Royal 20 spray system with Procite and water mixture. Total employees are 280 and 27 are on top.

Conveyors are laid down the center of 40-ft.-wide rooms.



Each conveyor extends to the entry where cars are loaded to 2,100 lb.



All minus 1¾-in. is washed in this 5-cell box.

Main entries are timbered by 35- to 60-lb. rail hitched into the ribs on 30- to 54-in. centers.

Only rooms with bad top like this are mined by old hand-loading methods.

Top workings showing truck bins, preparation and power plant.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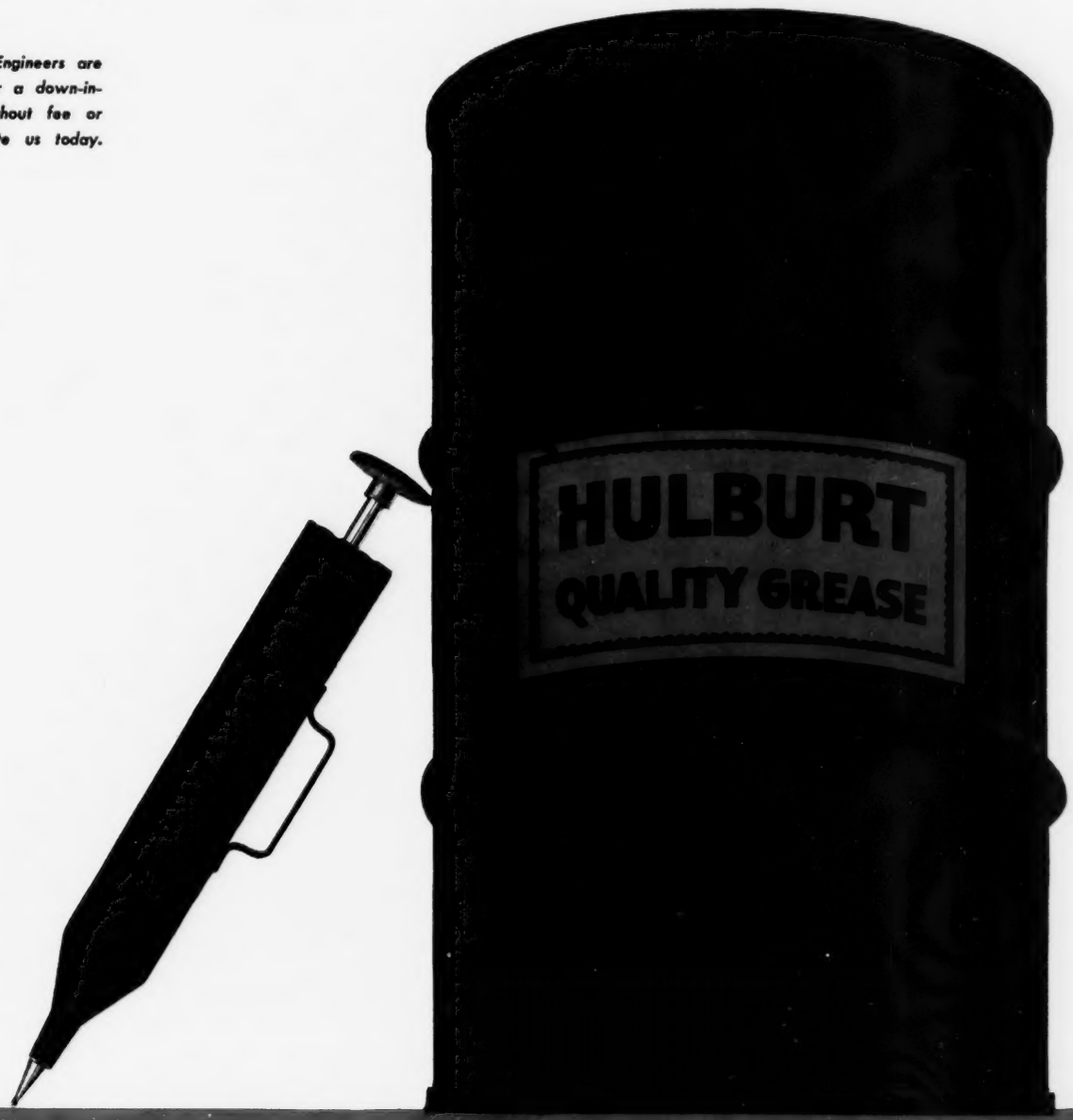


QUALITY GREASE

WATER-TREATMENT PLANT

At New River's Lochgelly Operation Gives Town Crystal-Clear Drinking Supply

By J. E. HOWARD
Chief Engineer, New River Co.
Mount Hope, W. Va.

WHETHER it be in the big cities or small mining towns, water supply is an ever-present problem. Possible sources at the mines are surface streams, springs, deep wells and the underground workings themselves.

Surface flowage usually can be eliminated because relatively few operations are located on streams which will contain water in sufficient quantity the year round. Impurity, contamination and cost of treatment facilities generally complete the process of elimination. Except in rare instances, springs are out because of insufficient quantity and contamination. Deep wells and the workings are most used and the workings are none too popular.

Deep Well and Spring Supply

A combination of the deep-well and spring supplies becomes available when shaft mines are opened. Such usage prevails at three of the mines of the New River Co., which operates in the low-volatile seams of Fayette and Raleigh counties, West Virginia. In this area one of its shaft mines is located at Lochgelly; depth, 571 ft. Hoist and air shafts are spaced 140 ft. apart.

For many years water has been supplied for domestic purposes from rings in these two shafts. By this method, water flowing through the subsurface rock and tending to fall into the shaft is caught in niches or rings cut into the side walls and conducted to a sump for use.

Customary procedure is to excavate a shelf about 2 to 4 ft. into and all round the shaft faces. The shape in side view will naturally become that of a right-angle triangle 4 to 6 ft. high with its base at the bottom. This base is finished off with a troughing of concrete having a thickness of 6 to 8 in. at its sides and 2 to 4 in. in center with width at 1 ft. 6 in. to 2 ft., dependent upon the judgment of the builder as to what will stand up best and lead off the water as fast as it enters. This troughing is graded slightly from a selected high point downwardly around the shaft in opposite directions to the discharge section. At this low place a drain pipe 3 or 4 in. in diameter is inserted in a vertical-diagonal position so that it leads from the trough to the face of the shaft wall and thence down with the wall.

At Lochgelly, the vertical pipe, anchored against the rib, drops down to a sump level which is 300 ft. above the shaft bottom. This sump was made by driving a tunnel horizontally from hoist shaft to air shaft. An airtight concrete stopping and dam stands near the ventilator shaft, with another about 5 ft. high close to the hoist shaft. A convenient open space is left at the top of the latter for inspection and clean-out purposes, all being convenient to the cage. Excess water flowing into this sump is wasted downwardly through the pump line by way of a check valve at the top and a manual valve at the bottom which stands open when the pump is not in use.

A special pump, 180 g.p.m., is set in the main pumproom near the shaft bottom to take care of town supply requirements. Water in the sump stands against this pump, through which it passes for elevation to a new raw-water tank on a hillside above the tipple. Overflow from this tank goes to railroad supply. The sump is pumped once each 24 hours. The raw water reservoir, 30,000 gal., becomes the town supply by treatment, which is necessary notwithstanding the underground, uncontaminated source. As is not unusual in Appalachian waters, it is heavily charged with dissolved iron bicarbonates, which causes redness on contact with oxygen.

In the autumn of 1940 a contract was let for a plant of size estimated for daily needs at Lochgelly—25,000 gal.—which should be treated in 6 hours. This would provide an extra hour for one-shift care of the equipment. Additional water could be furnished by extra hours of operation if required.

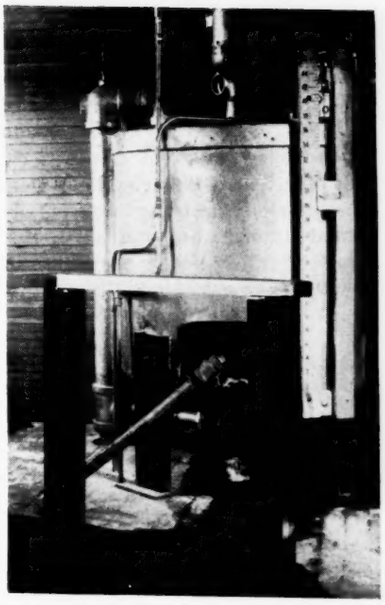
Plant Almost Automatic

The plant must be as nearly automatic as possible in order that an attendant already available at a new bath house to which this plant must supply water could take a little time each day to operate it. His work would be under the supervision of the New River Co.'s master mechanic, who would be responsible for care, maintenance and regular inspections. A chlorinator presently in service should be connected with it and the whole operation comply with public water-supply standards in West Virginia.

Analyses having been made, there remained only to adapt plant requirements to ground conditions. These conditions were simply that it should be located in an L-angle at the rear of the power house. Some excavation would have to be done. This would keep it near the chlorinator and alongside the 4-in. main leading from the shaft to the pure-water storage tank on the hill.

This line could be cut and the new plant should tie to and pump through it while the other end of the cut line should go to the raw-water tank. This would be accomplished with use of gate valves, with the old line so used as to provide a bypass direct from the mine pump to the storage reservoir in case of emergency. It must be clear of the aerial tramway, and steam lines could be run from the bathrooms steam plant to such housing as might be necessary. The whole would be under the eyes of the superintendent and outside foreman.

The plant finally installed under these general provisions called for a raw-water tank set at a suitable elevation above it for gravity flow of water to a point where it first comes under control of the treatment system. Flow is automatically kept to a rate of 60 g.p.m. This is accomplished by means of a float control and butterfly valve as set out in paragraph (b) following.



Chemical feed tank; note dust evacuator pipe at left by means of water jet, and feed line to water at bottom with clean-out tee.

Plant Operating Routine

The operating routine of this plant is as follows:

(a) Pumpage from the sump goes into a raw-water tank by way of a riser and perforated pipes over the top of the tank which provides for aeration.

(b) Water flows through a 3-in. pipe line by gravity from a raw-water tank to a point where it is first received for handling. It passes through a 2½-in. valve operated by float control so that it shuts off as the water rises in a box above the level set for pure-water flow through outlets to the filters. This means, of course, that all flow ceases when the pump stops because it is only then that the water can rise above the operating level. A lagging pump also would cause such a rise and shut off incoming water proportionately.

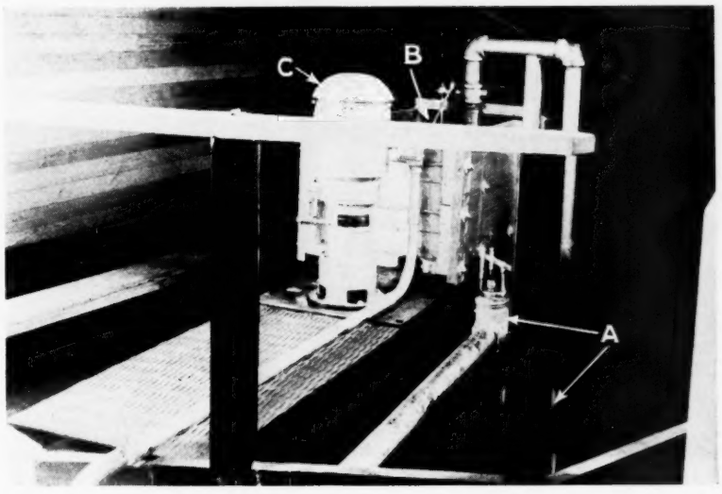
(c) Having passed through the inlet valve, the water is discharged into an open influent control box. A 2½-in. butterfly valve, operated by float control, acts to shut off influent water as it tends to rise above a predetermined level in the box. This level is controlled by the water which flows therefrom through an orifice board having certain apertures of an exact size to pass 60 g.p.m. of water under the head in the box. There is a marker showing the level at which the water should stand when this flow is being maintained. A rise or fall with reference to it will tell the operator when he is getting other than the desired flow. Irregularity will mean pipe stoppages, defective valves or pump, clogged filters or apertures not clear. It may then be time to shut down and call the master mechanic.

(d) Having passed through the orifice board, the water falls by gravity into a small end section of the main box and out by way of a 3-in. down pipe which leads to the top of a cone-shaped inner shell of the precipitator. Here it comes into contact with a wet mix of lime and soda ash flowing from the adjacent chemical feed.

(e) The chemical feed is a steel tank on which is set a ¾-hp. 1750-r.p.m. motor for operation of an agitator at the end of a vertical shaft. Within it a pipe hook-up, technically designed with use of swing joints and pin connections, which enables a surface draw-off head to rise and fall with the wet mix or added water, serves to feed the chemical to an outgoing 1-in. rubber hose connected at the base of the tank. A float indicator keeps the operator informed as to how low the liquid has fallen. When ready he simply adds lime and soda ash in desired proportions at a given rate per inch and refills with water, this being done once daily.

(f) Having come together at the top of the precipitator, the chemicals and raw water are slowly stirred by an agitator operated by a 4-speed motor set over the precipitator. Reaction and precipitation then begin to occur as the water flows vertically downward. The cone-cylinder through which it moves is suspended 24 in. off the floor of the main or outer shell. It passes under the edge of the cylinder and then flows upward at a rate of speed proportionate with the 60 g.p.m. at which clear water is being drawn off at the top. Its motion upward is gradually decelerated by the fact that the outer shell has the form of an inverted cone with increasing cubical content in its vertical rise.

(g) Within the slow and gentle motion which this represents chemical reaction is completed and the heavier-than-water coagulant gradually ceases to rise with the water. Settlement begins and occurs in a manner which gives the effect of a heavy muddy water floating like a cloud about 18 in. below the surface. One would be able to read



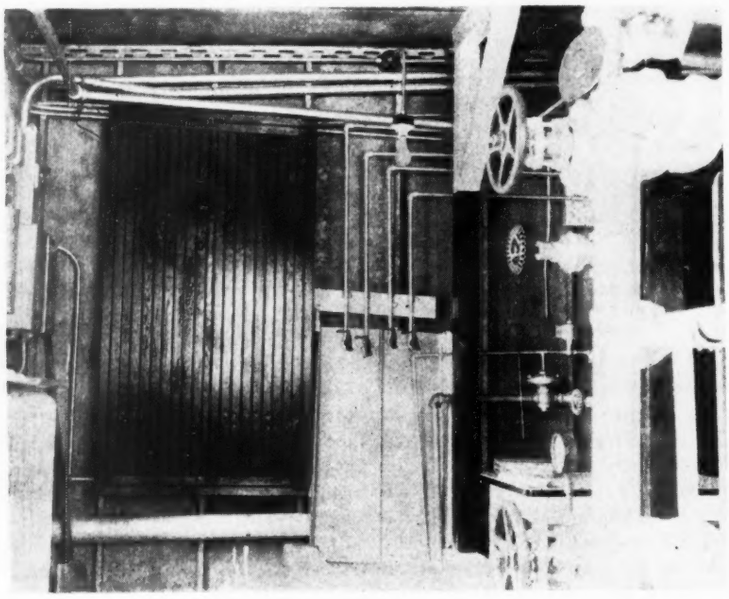
Water plant showing (a) raw-water intake valve and float, (b) influent box and butterfly float valve and (c) vertical motor operating agitator.

fine print through the clear water at 12 in. below the surface and not be able to see the book at 24. An electrically operated automatic pipe in the pumproom serves to open a valve for drawing off sludge at staged intervals and for stated periods. That is, it opens, say once every 20 minutes, and allows discharge from a mud ring through the sludge valve for 10 minutes, then closes. Its operation is set by experience and requires little attention. The purpose here is to maintain clear water in the upper 18 in. of the basin.

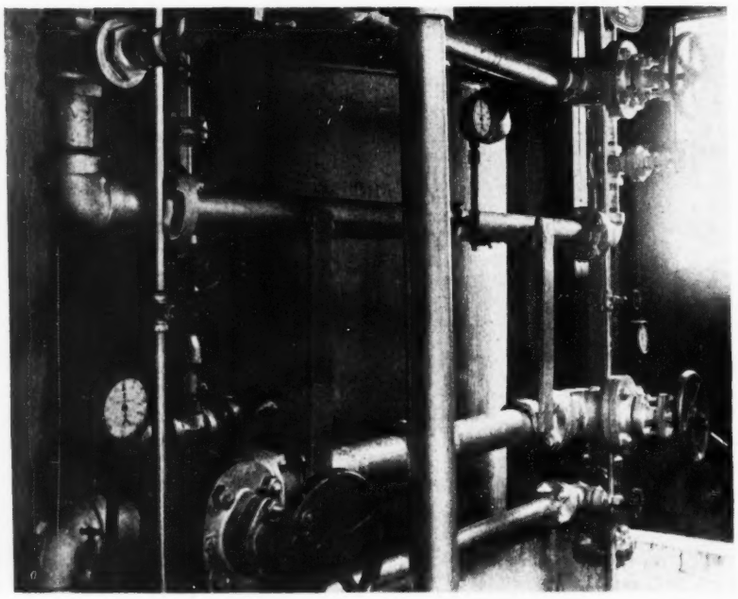
(h) As the water rises in the space between the inner and outer shells it flows through V-cuts over the edge of the inner one into a circular trough which leads it to a 3-in. effluent pipe. This pipe, 3 in. in diameter, leads from the bottom of the trough horizontally to and through the outer shell. Just below the elbow which turns it vertically downward a butterfly valve is set in the line and by leverage rods connected with a tank and float designed to actuate the valve under emergency conditions. This valve acts as a regulator of the supply going to the pump. It counterbalances tendencies to get out of line with the 60 g.p.m. rate of flow coming from the orifice box control, due to changes of head as the water in the storage tank rises and falls, or as other resistances may affect the pump action.

(i) The water now passes to the booster pump, electrically operated, and thence through two 54-in. steel-tank pressure filters to the pure-water storage, being chlorinated during this process. All necessary pipe hook-ups are made to provide for backwashing the filters at measured rate of flow. Manholes provide for inspection and maintenance of the sand therein.

(j) Within the pumproom are four taps for taking water samples from different levels, top to bottom, of the precipitator. Also the automatically discharged sludge flows through an open-end pipe into a trough so that the operator can see it conveniently and take off samples for specific-gravity tests. Taps are available for samples of water after it has passed through the filters.



Water sampling taps over concrete basin; note automatic diaphragm for sludge discharge and pipe to basin.



One of the two filters with control valves. Backwash provisions usually create impression of rather fancy equipment, but it is all essential: no backwash, no filters.

Daily Log Kept

Primary laboratory tests of the treated water are run daily and a log is kept for reports to the State Health Department. Tests are made by the operator for hardness, alkalinity and causticity; also for residual chlorine.

A feature of this plant is the Spaulding precipitator, which, in conjunction with related equipment, fittings and controls, makes it the first of its kind installed in West Virginia. On the evidence of four months' use and observation it can be said that performance to date meets all requirements. It can hardly be expected that disappointment may come later because the equipment within itself is of rugged construction and the technical items consist only of a few electrical parts and valves, all easy to watch and keep in repair.

Residents of Lochgelly express themselves unqualifiedly as glad to be rid of the reddish water they had become accustomed to and to have it replaced with the crystal-clear product now flowing through the mains.

Lochgelly water-treatment plant was designed and built by the Permutit Co. The author wishes to acknowledge reference to plans, specifications and letters of that company made available through H. Y. Keeler, engineer, in preparing this article.

ELECTRIC HEATING UNITS

On Shovel Dipper and Dipper Handles Reduce Breakage, Cut Wintertime Losses

Are you bothered with breakages in dipper handles in wintertime? Do accumulations of earth frozen to the dipper cut down capacity and increase lost time in shovel operations? J. W. Bullington here tells how the installation of electric heating units licked these problems at one large strip operation in the Illinois field.

By J. W. BULLINGTON
Chief Electrician, Fiatt Mine
Truax-Traer Coal Co.

DURING the winter of 1939-40 the Fiatt mine of Truax-Traer had considerable trouble with breaks occurring in the dipper handle on its 30-yd. stripping shovel. All of these breaks occurred in extremely cold weather when the metal was thoroughly chilled. As the result of several discussions among the operating personnel as to the practicability of installing electric heaters, the conclusion was reached that, if the metal could be kept warm to the extent of preventing the chilled condition from existing, it might prevent some of the trouble.

Since the shovel is a 950-B Bucyrus-Erie, the question of heaters was first referred to the Bucyrus company for its study and recommendations. The shovel manufacturer in turn referred the matter to the General Electric Co.'s heating engineers, who recommended the installation of twelve 2,000-watt Calrod heating units in the handle. No set specifications were furnished as to the location of the heaters, and it was decided in the field to place one line of four heaters in exact center bottom and another line of four in the exact center on each side.

Spreading the Heat

The units were to be staggered 2 ft. apart at the start, approximately 7 ft. from the attachment to the dipper, with 8-in. end spacing between each pair of units. This method permits a unit to be in contact with the metal throughout the entire length. A welded manhole for entering the handle in the top of the dipper provides an airtight cover at the dipper end. Beyond the end of the heat units a ⅛-in. plate header was installed with a few small vent holes. All other holes were covered with light plates so that they could be cut out whenever necessary.

Six heating units also were installed on the dipper itself to prevent earth freezing to the top, sides and back. This was done because in freezing weather so much frozen earth accumulates that approximately only one-half of the dipper capacity was effective yet the same power was required. Moreover, it was necessary to stop the shovel one to three times during each 24 hours that freezing conditions existed to thaw out the dipper. With fires from burning oil, old rubber tires and scrap lumber, the thawing usually required 30 minutes to one hour. It may readily be seen that if the installation of heaters would prevent these shutdowns a very large saving could be made: it would take only a very few such interruptions to completely offset a considerable investment in heating equipment. We feel that the expense of these installations is entirely justified from an operating and maintenance standpoint.

The heating units are straight, 112¾ in. long and 0.496 in. in outside diameter. For installing these units, 9-ft. lengths of No. 18 gage iron were formed in the shape of a V, slightly smaller than the units, with approximately 1 in. extending to each side of the V. These were placed over the units and were wedged down as tightly as possible. They were then tack-welded throughout their length. Terminals of the heating units were turned up approximately 1½ in. at each end to clear the metal of the handle.

Heats All Sides of Dipper

In installing units on the dipper, however, they are bent in the form of a U with terminals bent out 1½ in. to clear the metal. Units are placed in both upper and lower panels on each side of the dipper, one in the center panel back of the door and one in upper side of the top, coiled in the ledge between manhole and inside of the handle. This ledge is approximately 6 in. wide and the unit is clamped down with short pieces of the same material as used in the handle.

The units on the side and back are placed on ½-in. flat plate and ½x ½-in. square bar fillers are welded on each side of the unit, first being clamped in place as tightly as possible. These plates are then placed in the dipper side panels, wedged in

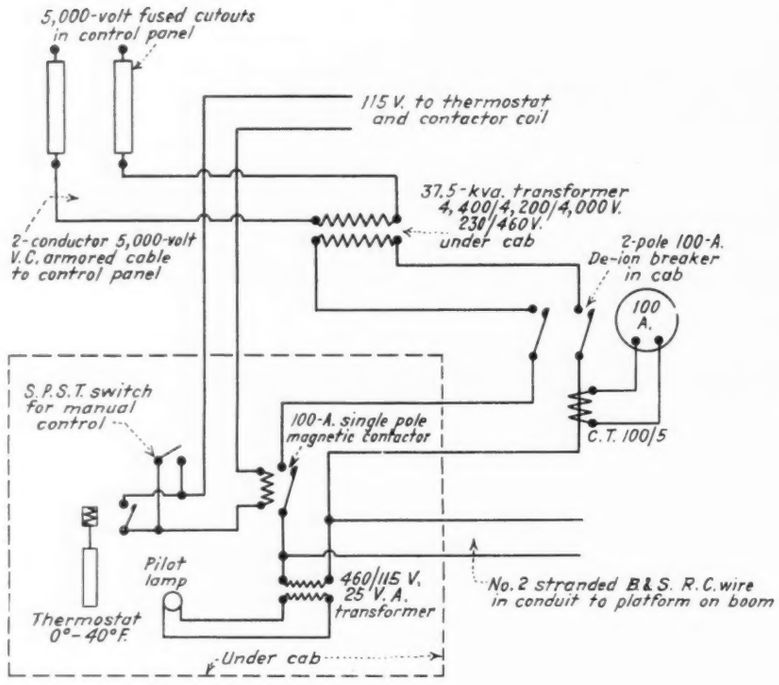


Fig. 1—Wiring and control arrangement for heating dipper and handle.

place, and welded. The dimensions of these plates will be governed by the size of the dipper and the location of the panels.

Eighteen 2,000-watt 230-volt Calrod units are used—a total of 36 kw.—making it necessary to install a 37.5-kva. transformer. This transformer was placed on a bracket which was built on the outside of the revolving frame under the operator's cab. A 5,000-volt varnished cambric armored cable is run through the regular wiring trough to a control panel connecting to the bus through two 5,000-volt fused cutouts. Transformer voltage rating is 4460/4200/4000—230/460.

A thermostat calibrated 0 deg. to 40 deg. F. also is installed at this same location. Control contacts are connected to a 110-volt contactor coil operating a single-pole 100-amp. contactor. A two-pole circuit breaker and ammeter to determine readily if all sections are heating are installed in the operator's cab. Secondary wiring is run along the boom in conduit paralleling the dipper trip motor circuit. A two-conductor power cable from the platform on the boom is lashed to the dipper trip cable to the point of attachments at the trip motor on handle. A 1¼-in. conduit is run from this point down the handle to the dipper where it enters the handle and is also branched out to heaters on the dipper.

The heating units are at present connected two in series across 460 volts and the transformer is on the 4,400-volt tap (our operating voltage is approximately 4,150 volts). This arrangement delivers slightly under rated voltage, giving a longer life to units. By having eighteen units—three units in series on 460 volts (approximately 153 volts per unit), four units in series on 460 volts (115 volts per unit)—a very flexible arrangement of different heats may be secured. Other slight variations may be made by changing 5 and 10 per cent taps in the high-voltage winding of the transformer. The thermostat is set to close the circuit at 25 deg. above zero as we do not experience any trouble above this temperature. In case of forewarned cold waves we can manually operate heaters to warm the metal to prevent freezing, rather than thawing after freezing.

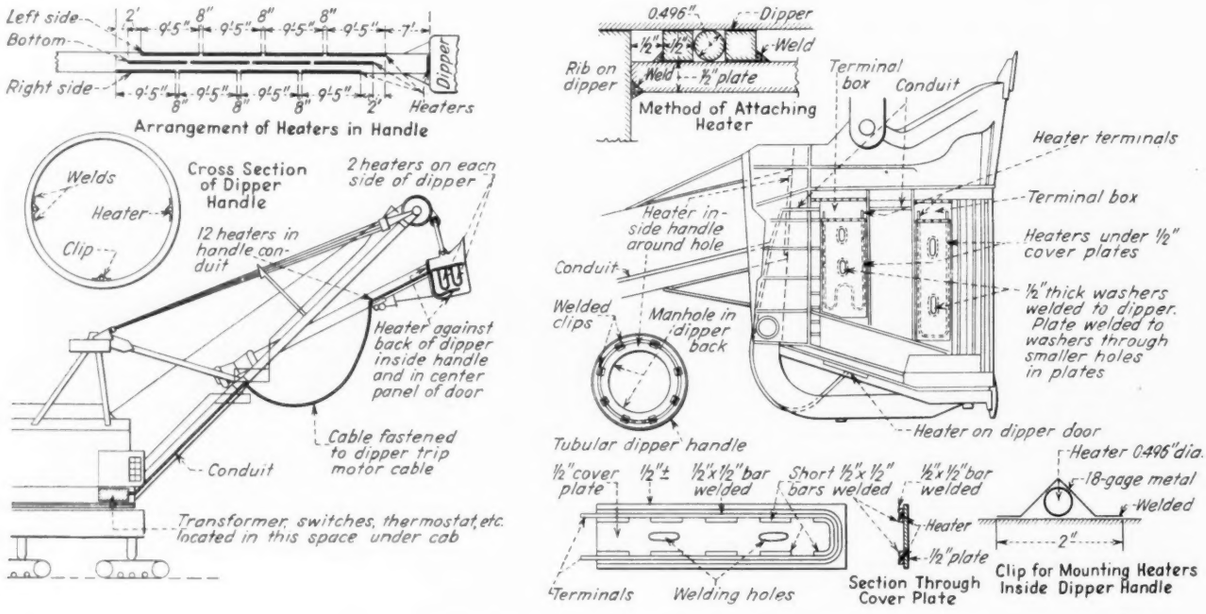


Fig. 2—Showing (left) heater and wiring arrangement and (right) method of attaching and arrangement of heaters on dipper.

THOMAS POWER PLANT

Of Davis Coal & Coke Modernized To Meet Changing Loads and Shorter Hours

By HAROLD G. BURRILL
Consulting Engineer
Baltimore, Md.

DURING recent years many coal companies have found it necessary to remodel their power generating and using equipment to meet changing conditions. Davis Coal & Coke Co., operating five mines in Tucker County, West Virginia, is no exception. Beginning in 1930, when it found itself with greatly curtailed production and without any appreciable reduction in power consumption, the company has been carrying on a program designed to keep pace with these changes. The latest stage was completed last year.

A survey of both the power-using and power-generating equipment at Thomas, made in 1930, revealed that great savings in power could be had in improving pumping and ventilating conditions in all mines. This work, started in 1931 and completed in 1934, resulted in a decrease of power used in non-productive equipment and lowered power costs per ton of coal mined.

Shortly after this project was completed labor conditions forced shorter hours and less working time per day. This in turn called for greater effort in order to maintain production and resulted in heavier loads on the power plant for short periods, causing peak loads beyond the capacity of the plant at that time.

Analysis of plant conditions showed that by rebuilding the largest turbogenerator, revamping the boiler room, and installing new auxiliaries, greater capacity could be obtained to take care of the increased peaks during the day load. The plant consists of three G.E. turbines with jet condensers, one 2,500-kw. and two 1,000-kw. The 2,500-kw. unit, while 18 years old, was built with a steel head and nozzle blocks and could be changed to higher steam pressures and temperatures. The two 1,000-kw. turbines, however, were of entire cast-iron construction and, due to age, speed, etc., were unfit for rebuilding and left entirely as standbys.

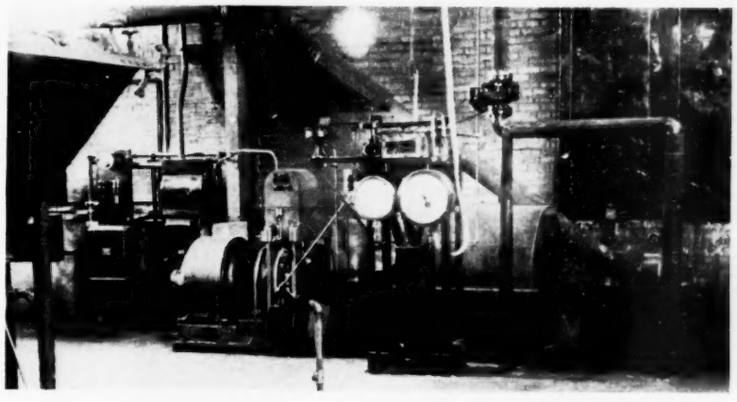
The boiler house contained six 400-hp. boilers and two 500-hp. boilers, all fired by stokers of old type and inefficient design. The two 500-hp. boilers were designed for 180 lb. pressure; the 400-hp. boilers, for 165 lb. pressure. Boiler ratings were very low and radiation and other losses were high when operating seven out of eight of these boilers, carrying only 2,000 boiler hp.

In order to improve economy, lower maintenance costs and reduce operating labor, it was decided to install new heavy-duty Westinghouse stokers under the two 500-hp. boilers and Foster-Wheeler superheaters with them so that the turbine room could be supplied with steam pressure at 175 lb. 100 deg. F. superheat instead of 150 lb. saturated.

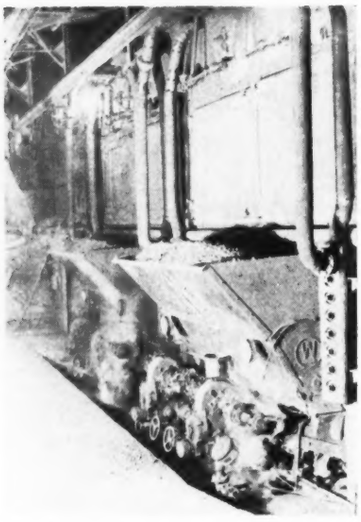
This work was done in 1935 and the results obtained were very satisfactory. The large turbine was rebuilt to operate at the higher pressure and temperature and to give 3,125 kw. instead of 2,500 kw. This enabled the large unit to operate by itself and carry the entire load, resulting in a much lower plant water rate and improved over-all economy.

These improvements were added from time to time on a carefully planned schedule. Despite higher wages, curtailed production, shorter hours, increased cost of materials and added obsolescence of units, the cost per kilowatt-hour has been lowered during the past ten years. The coal consumption per kilowatt-hour in 1930 was about 5 lb. per kilowatt-hour, while in 1939 it was approximately 2½ lb. per kilowatt-hour.

In 1940, due to age and increased rating, low grades of refuse coal burned, the settings of the 500-hp. boilers were in need of complete replacement. The increased ratings with high-ash coal had eroded the walls to a point where they were ready to crumble and fall. Analyzing the fuel



Dual-drive mechanism for forced-draft fan; the control handles both the hydraulic coupling on the left and the turbine on the right



Completed settings, with stokers and view of side water wall header.

burned and the load that must be carried by these boilers, it was decided that rebuilding the setting, using all brickwork, was not practicable or advisable and water walls were decided upon.

The new layout consists of eight 4-in. side-wall tubes on each side and 22 rear-wall tubes. Four of the side-wall tubes along the clinker line are armored with "cast-on" cast-iron blocks. The four tubes above the armored units cross above the side cleanout door so as to protect the arch of this door from excessive radiant heat. The rear walls were installed so as to permit the use of a 13-in. bridge wall instead of a 27-in. wall, as in the original setting, thus adding 1 ft. to the length of the furnace.

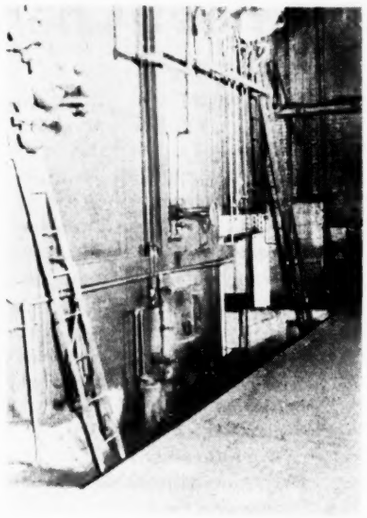
Rear-wall tubes were staggered to give a slag screen effect and to increase the radiant heat surface of boiler and water wall. A three-quarter setting was decided upon to facilitate bringing out blow-down headers, etc., in the rear and permit better handling of soot from the rear pass.

The addition of water walls reduced the amount of superheat but additional superheating surface was purchased in 1934 and not installed. About 20 per cent more superheating surface was added and this counteracted the effect of the lowered furnace temperature due to water walls. The average superheat is 100 deg. F. at 200 rating and 12½ per cent CO_2. The water walls increased the heating surface of the boilers 575 sq.ft. each, or 575 rated hp. It is felt, however, that the boilers will easily generate 35,000 lb. per hour each in spite of high-ash low-fusion coal burned. Furnace cleaning periods will be extended from a weekly to a monthly schedule, thus reducing the number of boiler outages, lowering the quantity of coal used for starting up and decreasing the amount of labor for cleaning, etc.

Records since the boilers were put in service, about Nov. 15, 1940, show great improvement in furnace operation. The flue gases were checked and it was found easy to maintain 12½ per cent CO_2 during both peak loads and the lighter loads which occur at night.

Duplicate Worthington centrifugal feed pumps are installed in the power plant. One pump is driven by a Terry steam turbine and the other by a Continental constant-speed motor; both have Fisher excess-pressure controls which maintain constant excess pressure on the feed-water line, enabling the Copes feed-water regulator to function properly. The forced-draft fan is dual-driven, on one side by a Terry steam turbine and the other by a G.E. motor constant speed with an American Blower hydraulic coupling. Both the coupling and the turbine are controlled by a Brooks steam-pressure regulator especially equipped with an automatic reset device arranged to handle heavy load swing and yet maintain reasonably steady steam pressure without forcing the fires too much on short peaks.

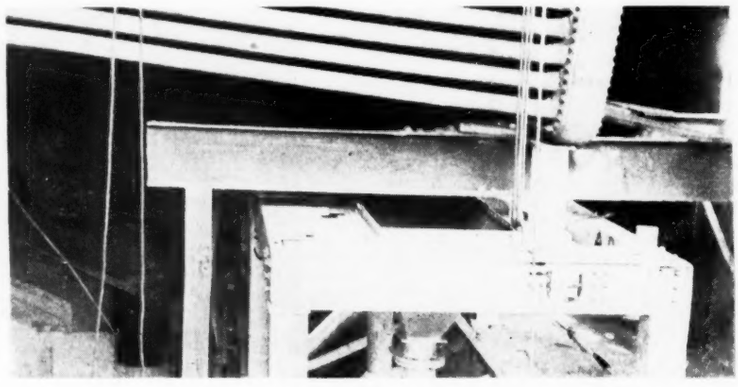
Feed water is heated in an open heater supplied with exhaust steam from either the forced-draft turbine, the feed-water-pump turbine, or the steam from the turbines driving the Westinghouse stokers. This is regulated by the boiler-room attendant who checks his feed-water temperature and puts in service either the motor-driven or the turbine-driven feed pump, according to the steam demanded by the feed-water heater. The exact balance is then finally effected by operating both the motor and turbine on the forced-draft fan and admitting just sufficient steam to the turbine end to balance the demand, with the motor drive making up the amount of power required by the forced-draft fan. Ashes and soot are discharged into a large concrete hopper under the stoker and are removed by a motor-driven larry car to the ash dump or into cars on the Western Maryland R.R.



Rear view of setting with water-wall supports.

The entire job was handled by the consulting engineer, assisted by J. J. Luden, master mechanic, and J. F. Foreman, mining engineer.

Firebrick was supplied by National Refractories Co., red brick by Thornton Brick Co., and general brickwork by Geo. Dashiells & Sons. The La-France Co. furnished the Hytemperature cement; Edgemoor Iron Works, the water walls; Johns-Manville, baffle material, and New York Central Iron Works supplied the boiler-supporting steel.



How the boilers were supported while installing the water-wall supports.

ILLINOIS TRUCK MINE

Connects With Rail Transportation While Modernization Program Triples Output

ORIGINALLY opened in 1934, the Braidwood mine of Wilmington Coal Mining Corporation, Morris, Ill., employed a diesel-operated dragline with 5-yd. bucket and 110-ft. boom for stripping. Coal was loaded by a gasoline-powered shovel with 1-cu.yd. dipper. Haulage was by 6-ton gasoline trucks and preparation by a 100-ton, increased to 400-ton, per-day-capacity wood tipple which made three sizes. In the summer of 1940 a thorough modernizing job, including pit and haulage changes, an all-steel preparation plant with 900 tons bin storage and installation of railroad services, was completed. Old equipment was moved to another property.

These changes were needed to meet increased truck demand and good preparation was essential to keep that trade. Railroad service tapped markets difficult to reach by truck. Life of the mine has been increased by 35 years at 200,000-tons-per-year production. Output now is 800 to 1,000 tons and capacity is 1,500 tons per shift. Brothers Ralph and Carl McElvain operate the company as president and vice president in charge of operations, and Hugh Price is superintendent.

Overburden—alluvial sand and soft blue shale—is 54 to 70 ft. thick. The sand averages 14 ft. and is stripped off the shale, making an 180-ft. bench. The dragline works on top of this bench, making a 90-ft.-wide pit. No shooting is required.

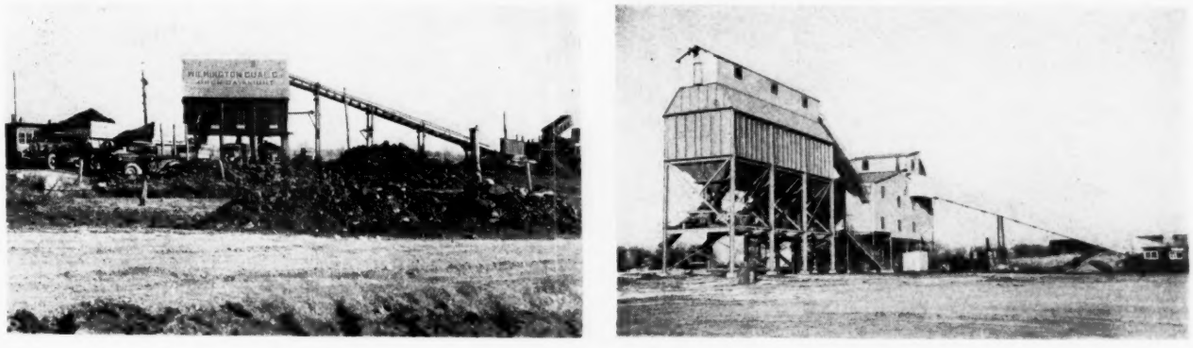
Stripping is by a Page No. 630 all-electric walking dragline. It has a 185-ft. boom and 12-yd. bucket and is operated by a 700-hp. synchronous motor-generator set at 4,000 volts a.c. and with Ward Leonard control. Hoist and drag motors are 250 hp. and the two swings are 75 hp. All are Westinghouse. A 2¼-in. American Steel & Wire Co. drag cable is used and its average life is 800,000 yd. Hoist-line speed is 320 ft. per minute. The unit features a walking shaft in three sections and can make nine 6-ft. steps per minute. The circle rail is 34 and the tub 38 ft. in diameter.

All controls are air except the hoist and swing. Boom whip is prevented by an air-cylinder shock absorber holding the guy wires. The gantry permits readily lowering the boom, puts weight on dollies at front of drag and allows a low A frame. The operator's cage on the front top and center of the machine gives unobstructed vision. Efficiency has been increased by installation of an Esterline-Angus recorder which gives a graphic picture of the swings per day. The unit averages 16,000 yd. per day.

The 38-in. Wilmington 3d Vein or No. 2 seam is taken up by a gasoline shovel with 2-yd. dipper and loads out the entire pit width. It is all clean coal and is not shot, but it is planned to slab with a shortwall cutter bar. Dewatering is by five 4-in. centrifugal 100-ft.-head electric pumps operated by 440 volts a.c. All are portable and discharge onto the bench and highwall into ditches.

Haulage is 3½ miles one way by three Dart trucks with United Iron Works 32-ton automatic two-door drop-bottom Man-ten steel semi-trailers. They are powered by Hercules 200-hp. gasoline engines and fuel will be changed to butane. There are four 13x24-in. tires on the semi-trailer and ten 9.75x24-in. on the tractor. All of these have lug-type treads except the two in front.

Roads are made with ditches on each side and are graded to 2½ ft. above ditch-water level. An 18-in.



Before and after: at left, the original wood tipple; at right, the modern all-steel combination truck and railroad preparation plant.

An all-electric walking dragline with 185-ft. boom and 12-yd. bucket replaced a 110-ft.-boom 5-yd.-bucket diesel unit in 1940. The 38-in. seam is loaded into 32-ton semi-trailer trucks by a 2-yd. shovel.

layer of gob and 8 in. of gravel are laid. The crown is 30 ft. and shoulders are 12 ft. It is sprinkled with water in the summer and maintained by a Caterpillar diesel No. 11 road patrol with 10-ft. blade. In the pit an R.D. 8 equipped with a LeTourneau Model XD9 bulldozer with mechanical control unit is in service. The present pit is ½ mile long and entered at one end on an 8-per-cent grade. However, a 1-mile pit will be made with a ramp at its center from the highwall.

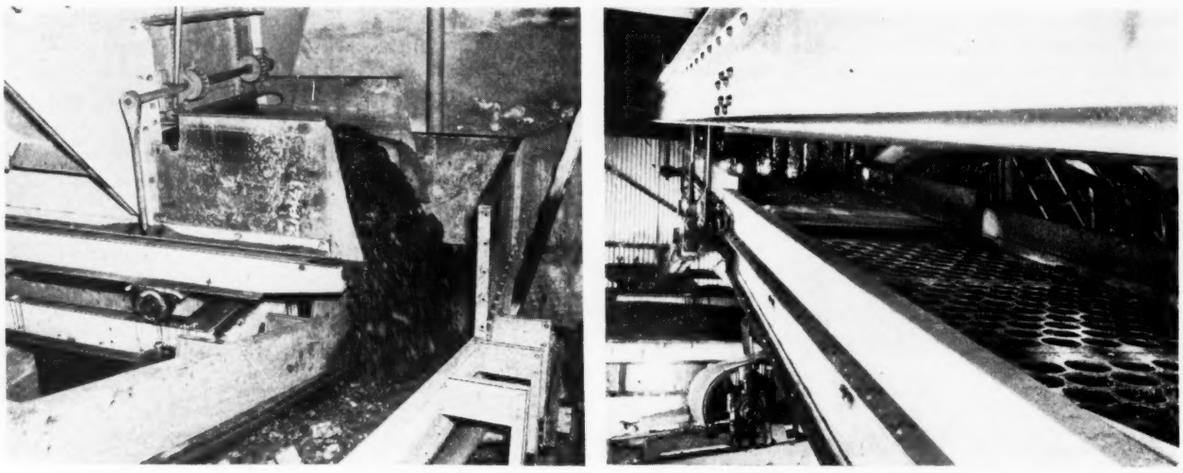
The all-steel preparation plant with corrugated siding was designed, built and equipped by the Robins Conveying Belt Co. Trucks dump into a 90-ton steel hopper emptied by a reciprocating feeder at 250 tons per hour onto a Goodyear 42-in. 220-ft. rubber belt on 18-deg. pitch. It discharges onto the main shaker classifying screen, at which point 1 gal. of oil (Ohio Oil Co.) per ton is applied at 120-lb. pressure in five sprays by a Viking hot-oil system Winter viscosity is 1,000 and 1,500 in summer.

This shaker is single-deck and made up of 5-, 3- and 1¼-in. round-hole 48x62-in. screens with double action between the 3- and 5-in. hole sections. Both the 5-in. and 5x3-in. are cleaned by two pickers, with room for four, at each table. The lump passes by a steel apron-type boom into a 100-ton bin. Egg is carried by one compartment of a 36-in. two-compartment drag conveyor to a 250-ton truck bin. This conveyor is on 310-ft. centers with 51 ft. of gallery to the bins and compartments are 12x18x24 in.

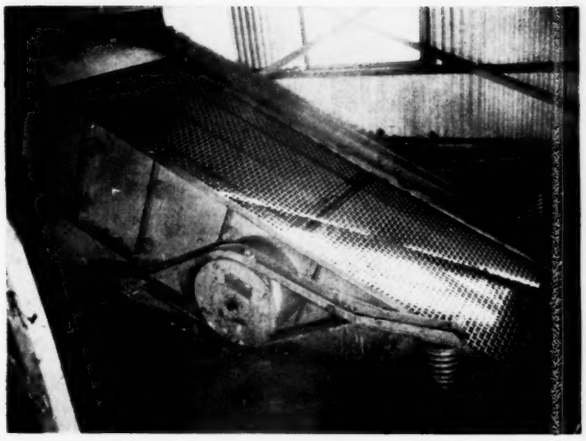
Break Coal to 1¼-In.

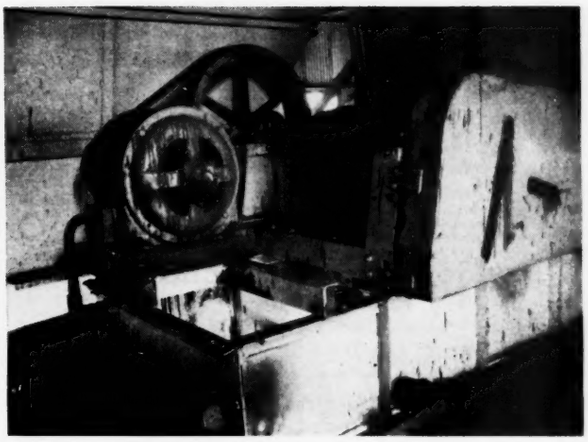
The 3x1¼-in. is broken to minus 1¼-in. by an adjustable 24x36-in. double-roll crusher and passes onto the run-of-mine belt to be reclassified. This crusher may be bypassed. Minus 1¼-in. may be stored in a 250-ton bin for railway-car loading or made into stoker size by passing over a Vibrex double-deck vibrator screen. The top deck has ½-in. and the lower deck ⅛-in. mesh. The 1¼x⅛-in. stoker is stored in a 250-ton and minus ⅛-in. in a 50-ton bin. Reject is held in a 50-ton bin under the picking tables.

All bins are steel with square tapered bottoms; lump and egg bins contain Holmes 26-ft. 14-in. spiral chutes. The lump bin bottom has ½-in. slotted holes for removing degradation and loads trucks by two 3x12-ft. steel chutes. All other bins discharge through clamshell gates. Degradation of egg and stoker is removed by Vibrex 3x4-ft. ¼-in. and



Left—A reciprocating feeder empties 90-ton truck hopper at 250 tons per hour onto a 42-in. rubber belt serving preparation plant. Right — Mine-run is hot-oil treated as it passes onto main shaker classifying screens.





Left—Stoker coal is sized by a ½-in. top- and ⅛-in. bottom-deck mesh vibrator screen. Right—An adjustable 24x36-in. double-roll crusher breaks all 3x1¼-in. to minus 1¼-in. which is reclassified.

⅛-in.-mesh vibrator screens at the chutes. Degradation passes by a 6-in. 60-ft.-long chain drag conveyor and a bucket elevator into the screenings bin. The minus 1¼-in. screenings bin loads directly into trucks. Carbon, by means of a sliding chute, may be loaded into trucks or railroad cars. Reject is about 2 per cent and is gobbed on the roads.

Pickers remove impurities from the egg size. Lump also is cleaned.

Trucks are housed in a corrugated-iron 64x75-ft. combination shop and garage. Equipment includes a 50-lb. trip hammer, 14-in. lathe with 10-ft. bed, 14-in. drill press, forge, two 300-amp. electric welders, three oxy-acetylene sets, one 8-in. and one 12-in. double-wheel grinder and three Lincoln air-operated 100-lb. drum greasing tanks. Greases and oils are Socony-Vacuum. Steam radiators and fans heat the shop and plant.

The weigh house is open 24 hours a day and loading is supervised by one man at the chutes. Trucks are weighed by a Columbia 20-ton scale and the normal shipping distance is 60 miles to Chicago, but 1,200 miles into South Dakota has been traversed. All trucking is by private owners or is contracted. One salesman is employed. Output now is 5-in. lump, 5x3 and 5x1¼-in. egg, 1¼x⅛-in. stoker, 1¼-in. screenings and minus ⅛-in. carbon, all oil-treated. Mine-run can be loaded in the pit.

One Railroad Track Used

Railroad cars are loaded at the side of the plant on a single track of 32-empty and 22-loaded-car capacity. It is a 1,000-yd. spur to the Chicago & Alton R.R. with 1,000 yd. of passing track constructed by the coal company. Any size can be railway-loaded by a 36-in. 220-ft. belt conveyor from the truck bins, but principal shipment is carbon. Summer tonnage is mostly rail and totals 20 per cent of yearly output. A Howe railway scale is on hand.

Employees, including superintendent, total 38, of whom 17 are in the pit, consisting of three dragline operators and three oilers for three-shift operation; three coal-shovel operators consisting of a bulldozer operator, loading-shovel operator and a groundman; three truck drivers; one road-maintenance operator; one pumpman per shift and one pit foreman. At the preparation plant there are eight employees made up of four pickers, two on lump and two on egg; one truck loader, car dropper, etc., for each shift; and a foreman. In the shop there are eight men, consisting of one electrician, three blacksmiths and welders, one carpenter, one machinist, one truck oiler and greaser on the second shift, and one welder on the third shift. There also are two weighmasters on the day and one on each night shift.

Power is furnished by the Northern Illinois Public Service Co. at 33,000 volts, transformed and metered at 4,000 volts at the edge of the property. It is then carried by Westinghouse armored submarine cable for ¾ mile to junction boxes on 1,000-ft. centers where it is transformed to 440 volts for pump operation. The dragline is equipped with 1,000 ft. of cable on a motor-operated reel. The preparation plant operates on 440-volt a.c. with a 110-volt light circuit which is metered at the plant by the power company. Total horsepower is 234. Each motor is equipped with Cutler-Hammer controls and all wiring is in conduit.

The 26-ft.-deep 250-ton bins are filled by spiral chutes.

FOREMEN'S QUESTION FORUM

Good Secondary Mine Voltage — Or Else How Best to Attain That End

By FRED W. RICHART
Editorial Staff, Coal Age

PERHAPS no one thing around a coal mine causes so much and such exasperating trouble as trying to operate a.c. motors on poor voltage. Though the attention of operators and maintenance men has been called again and again to the evil effects of low voltage, they are so important that they will bear repetition. With a.c.-driven equipment, efficiency is twice as dependent on good voltage as when d.c. units are being operated.

Here are some facts about standard a.c. induction motors which are true regardless of the voltages recorded on the name plates:

1. Torque, or turning power at the shaft, is proportional to the square of the voltage applied to the motor terminals. In other words, if with normal current flow, 220 volts is applied to the terminals of a 220-volt 3-phase motor, it will deliver a certain rated horsepower at the shaft. Call that "100-per cent torque." If the voltage drops to 180, the torque will be only $\frac{180 \times 180}{220 \times 220}$ = 67 per cent of normal torque, or two-thirds of the rated horsepower.

2. Manufacturers guarantee motors to operate satisfactorily on voltages 10 per cent above or below normal, if frequency is maintained. That means that insulation of the motor is guaranteed for 10 per cent overvoltage, and there is a margin in the design that gives it full-load torque at 90 per cent normal voltage. Furthermore, motors are guaranteed to carry 15 per cent above rated load continuously without exceeding name-plate temperature rise, provided normal voltage and frequency are maintained. This margin is called the "service factor."

3. Motors have a "pull-out" or "stall" torque which varies greatly with the horsepower and speed ratings of individual motors, and with the various types. Some averages will give an idea. Normal torque, normal current, 1,200-r.p.m. squirrel-cage motors of 10-, 25-, 50- and 100-hp. sizes have an average pull-out torque of a little over 200 per cent of the normal value. Slip-ring motors of same size and speed will have a pull-out torque averaging about 275 per cent of normal value. This, of course, means at normal voltage, which so often is not available. It also means that a motor will hang on to increasing loads until it burns up, if overload devices fail, for doubling the load means four times the heating.

Now, what happens if secondary voltage fluctuates more than this 10 per cent, up or down? (a) The manufacturer's guarantee is voided. (b) If the voltage is down, the motor overheats and may burn up, if its protective devices are set too high or fail. (c) Production is suspended temporarily if the control functions properly, disconnecting the motor from the line. It is therefore certain the penalty for low voltage will be impaired production, loss of manufacturer's guarantee, reduced motor life or even an expensive repair job. All these may be avoided by maintaining voltage.

There are three ways of avoiding these penalties, particularly the loss of coal production. Obviously the proper one is to make secondary power lines heavy enough to carry the loads with limited loss. This requires so much copper for long 220-volt lines that it is rarely done. A scheme that costs nothing extra is the use of 9 to 1 ratio transformers instead of the standard 10 to 1 ratio. That gives a secondary voltage of 244. That is outside the makers' guarantees but not much, and limited overvoltage is far less harmful than overcurrent. A third remedy that has been used to a limited extent is to have motors rewound with lower voltage coils—say, 180 volts. This gives the rewound motors pep but is a move in the wrong direction, for it overloads the lines and makes poor voltage even worse. It is far better to boost the voltage.

Use of three-wire cable for secondaries instead of spread-out single wires is of some advantage, for in that case induction losses are at a minimum. However, such savings probably are not justified unless there is some other reason for using cables. It is possible a mining system using wires of definite length that are quickly transferable from place to place could be devised in which cables would be justified.

In any event, the operator who demands full value from his mechanized units should see that they get full voltage. Otherwise, efficiency will fall out of the window and costs shoot toward the sky.

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What Mixture of Firedamp and Air Will Cause Maximum Violence in a Mine Explosion

A FEW YEARS back, it was customary to declare that in a firedamp explosion the greatest evolution of heat per cubic foot of atmosphere involved would occur when the quantity of oxygen present was just sufficient to enable the carbon and hydrogen in methane to burn to carbon dioxide and water respectively. Any more oxygen would mean that more air would be present than was necessary for combustion. Accordingly, that excess air would lower the temperature of combustion needlessly, and the excess oxygen would serve no purpose. Any less air would fail to supply the methane with the needed oxygen for complete combustion.

Obviously, it seemed that the quantity of air readily could be calculated, and pencils were sharpened to do so, but for some time scientists have been skeptical of all such calculations, for it is not certain just how nearly methane will burn completely all the oxygen necessary to satisfy the "all-out" formation of carbon dioxide and water. With a much less concentration of methane, some carbon monoxide has been found to form. With just enough oxygen to satisfy the methane, it is likely that a large percentage of the carbon in the methane will form the monoxide instead of the dioxide of carbon and create much less heat, and some methane may not burn at all. More oxygen may cause more methane to burn to carbon dioxide and so make more heat per cubic foot, even though more air has to be present to supply that oxygen.

For this reason, we might ascertain by such a calculation not the most violent mix but instead only the mix that will create the maximum quantity of carbon monoxide, though that also is uncertain. In that case we would have found the firedamp mix giving the most toxic atmosphere. However, a higher methane percentage might produce even more carbon monoxide.

Equation, for burning of methane is:

$$CH_4 + 2O_2 = 2H_2O + CO_2$$

This equation shows one molecule of CH_4 (methane) and two molecules of oxygen burning to form two molecules of water and two of carbon dioxide. There would be no increase in volme if it were not from the heat evolved. The formation of carbon monoxide produces only 28.0000 per cent as much heat as the formation of carbon dioxide and only 26.6561 per cent as much heat as would accompany the formation of carbon dioxide and its solution in water.

It already has been shown that there is twice as much oxygen as methane in the mixture that is supposedly the most explosive possible. But in air there is 79.03 per cent by volume of nitrogen and 0.03 per cent by volume of carbon dioxide or 79.06 per cent of inert gas and 20.94 per cent by volume of oxygen. Thus, there is 100÷20.94 times = 4.775 times as much air as oxygen and therefore 2 × 4.775 times = 9.55 times as much air as methane by volume. In other words, 9.55 cu.ft. of air is needed for every cubic foot of methane.

But this will total to 9.55 + 1 cu.ft. in all (air and methane), or 10.55 for every cubic foot of methane, so to find the percentage for a mixture in which both appear, both 9.55 and 1 will have to be divided by 10.55 and multiplied by 100. The mixture will be found to be 90.52 per cent air and 9.48 per cent methane.

However, as stated, this means little. When there is a large percentage of carbon dioxide, methane will not explode, and probably when there is a still larger percentage it will not even flame, and with still more it may not even roast slowly into carbon dioxide, especially as much moisture is present to deaden the heat. Information Circular 6983 of U. S. Bureau of Mines declares only that "in explosions of methane and air the flame travels fastest in mixtures containing 9.5 to 10 per cent of methane."

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Large Shuttle Cars Running on Rails Afford Both Increased Safety and Economy*

By DAVID W. JONES
Superintendent, Princeton Mining Co.
Princeton, Ind.

PRACTICALLY all the unsafe, reckless and undesirable practices which crept into the previously accepted "fast-car-change" at the mechanical loader can be eliminated by the shuttle car. With such a car on tracks, it seems unnecessary to speak of new measures to improve conditions.

High cost of track material due to unnecessary waste and loss of material should not be permitted to condemn this form of haulage but should be charged to neglect and carelessness, for it is not legitimate operating expense. Better management and development planning should conserve both track labor and material. If a small mine loads coal mechanically into a 1-ton car, a 3-ton shuttle car will save the time lost in two car changes which can be converted into loading time. A larger mine loading mechanically into a 3-ton car will save the time of two car changes by use of a 10-ton shuttle car.

Eliminating two-thirds of the cars servicing production, traffic density and exposure to accident will be reduced in the same proportion. Room track can be kept clean, as, both in loading and haulage, less coal is spilled around a large car and, where the car is wide, any material spilled will fall at a distance from the track, so haulage roads will be cleaner.

So long as the gathering locomotive is coupled to the large shuttle car, no one will be making switches on the run, coupling cars on the fly, crawling between cars to split trips, riding in cars out of control or jumping on and off moving cars or locomotives. No empties or loads will be spotted or left standing on the run; thus a more systematic routing of the loading, cutting and drilling machines as well as a better control of tracklaying and timbering will be possible.

Foremen will have their attention directed to safety rather than to straightening snarls in haulage. Neither loads nor empties will be dropped in unexpectedly on men at the face—a frequent source of serious accidents in the past. Haulage accidents usually result from misunderstanding, confusion, congestion and haste, and large shuttle cars will eliminate these.

*Abstract of article presented at 32d annual convention of Mine Inspectors' Institute of America, June 4, 1941, Bluefield, W. Va.

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Three Ways to Make Water Acid Eating Out Pumps and Mains

Allowing water to flood old rooms in order to delay pumping, lifting water out of roadways into old workings, or blocking room mouths to hold back water in old caves are three ways of promoting acidity in the worst possible places, for such water will eat not only the main pump and water mains but, passing through subsidiary pumps and pipes, also will damage them.

A company with a shaft and entries which ran north and south found a lot of water coming in from the active rise headings to the north. The south entries had a large number of standing rooms that were not working. As business was bad and the mines were running irregularly, the foreman decided to stop the pumps and let the water from the north entries run into the south entries. It would have to be pumped out eventually, but meantime the cost of coal would be kept down and the pumping expense would not raise the cost of operation so painfully when operation was more steady as it would when operation lagged. Besides, by that time the annoying influx of water might have decreased.

What that foreman did not "figure" was that all that southern area was full of acid crystals that would make the water intensely acid and that the water would eat out the pipes and pumps and increase the cost of pump maintenance. He learned that later—too late.

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How Classify This Accident?

The following accident exhibits clearly how one accident causes another, which in turn causes a third; this causes a fourth and sometimes the train of causation stretches even further. One bad practice may convert a potential hazard into a real one, in a seemingly unlikely manner. This story is taken from the May issue of *Mining Safety*, a news letter published by the National Safety Council, Mining Section.

"In a relatively recent case in a Western coal mine, a trip of loaded pit cars was being pushed in strictly fresh air on a main parting within a few hundred feet of the surface. One or more of the cars jumped the track, pulled out some timber legs, let down some timber collars with the trolley wire attached and, when the live trolley wire encountered the steel cars, an arc followed and this ignited the coal dust which had accumulated on the timbers and had been thrown into the air when the timbers were torn out. The resultant dust ignition caused the death of one man, and probably a major coal-mine disaster would have occurred if the mine had not been well rock-dusted; also some of the adjacent floor and other surfaces were wet."

Here a bad practice—pushing a trip of cars—causes: (1) a derailment, (2) timber displacement, (3) a cloud of dust, (4) trolley-wire displacement onto mine cars, (5) an electric discharge, (6) ignition of coal dust and an explosion.

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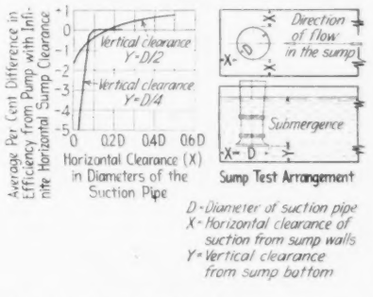
Efficiency of Propeller Pumps Affected by Sump Clearance

To get best results from a pump, a sump of suitable size must be constructed and this does not always mean a sump with clearances downward and in a horizontal direction as large as possible. Experiments have been made by the Peerless Pump Division of the Food Machinery Corporation with a sump where the inlet was located half its diameter above the bottom of the sump, and it was found that while the efficiency fell off rapidly when the horizontal clearance was greatly reduced at the end of the sump, it was greater with moderate clearances than if the clearances downward and in a horizontal direction were infinitely large.

Where the inlet was only a quarter of its diameter above the sump bottom, the efficiency dropped off immensely with small horizontal clearances and never exceeded that with unlimited clearances, but reached that figure where the horizontal clearance was only a little more than one-tenth of the diameter of the pump orifice. In this instance, inlet and orifice should be understood as not referring to the venturi opening in the entrant pipe but to the exterior opening of the suction entrance. If it is desired to draw the water in the sump down almost to the bottom (D/4) it will be necessary for maximum efficiency only to provide horizontal clearances equal to a tenth of the diameter of the inlet, D/10, beyond that there is little advantage to be gained in increasing horizontal clearances.



Within bounds, limiting clearance seems to increase pump efficiency.

QUESTIONS ASKED BY STATE BOARDS

Queries Asked First and Second Class Foremen At Examination Held in State of Ohio*

Dangers Lurk in Old Mine

Q.—In driving downgrade toward an old abandoned mine, what dangers would be faced when holing into these old workings? Explain fully what conditions would make such work extremely dangerous.

A.—Even in a region where everyone believes no methane is present, an abandoned mine may contain that gas, for ever since ventilation was suspended, the methane emitted, however small a quantity, has been accumulating. Though it would be foolhardy to enter such a mine with an open light, such folly might not cause an accident, for the quantity of carbon dioxide might prevent an explosion or might permit only a feeble flash of flame near the roof.

However, should the atmosphere from these abandoned workings enter a well-ventilated mine, this same methane might prove extremely dangerous. The heavy carbon dioxide might stay in the abandoned workings, the light methane might travel up the inclination, and an explosion might ensue after the methane had mixed with fresh air and come in contact with a light or an electric spark. Moreover, even if the extinctive gases were well mixed with the methane, when that mixture was introduced to fresh air, the combination might be highly explosive.

In breaking into an abandoned mine, one always must be prepared for an influx of carbon dioxide, which, being heavy, would flow like water into the slope. It would be well to make plans for taking care of a large quantity of carbon dioxide or to have some way of controlling its entrance into the active workings. Observation when a borehole has been driven into the abandoned mine will determine whether the free passage of air from the old workings should be restricted to the hours when the mine is not working. More probable than an inflow of carbon dioxide would be an inflow of a mixture of carbon dioxide with nitrogen, or of these gases separately, which also might asphyxiate miners unless controlled.

Rush of Water to Be Feared

Also, there may be an incursion of water, for the water may be backed up to a considerable height in the abandoned mine. This danger will occur even if all the live workings in the mine under operation may be many feet above the point at which the working mine breaks into the abandoned mine, for, so long as the surface of the water in the latter workings is higher than the live workings in the mine being operated, an inundation of those live workings may be expected. The abandoned workings may have had working places at a higher level than some of the workings in the operating mine or may be connected through breaches to the surface and be subject to the full head between mine and surface where connection may be made to a lake, pond or muskeg. When the water rushes into the working mine, it may travel so rapidly that it will reach a level above the static level, as a wave coming ashore may be lifted several feet above the surface of the ocean.

It is well to remember that the air in the abandoned mine was greatly compressed in the rooms and headings as the water rose. A pressure of 230 ft. would give a pressure of about 100 lb. per square inch. The air may have escaped through the measures, letting the water rise to the tops of the several workings; though usually for a while the air blocks the rise of the water and it may never rise far enough or with pressure enough to drive out all the air. When, however, the new workings break into the old, this air or atmosphere with the methane, nitrogen and carbon dioxide it contains will be pushed by hydraulic and air pressure up the slope and may travel farther than the static level of the water in the abandoned working. Such a sudden release of compressed methanized air or blackdamp may imperil the lives of miners.

Belches Like Bottle of Pop

When the water in the abandoned mine, by pumping or otherwise, falls to a level where the atmosphere can just escape into the room or heading entered by the slope in the operating mine, if that atmosphere is still under pressure, it will throw out the water violently, causing what is commonly known as a "belch." It acts much like liquid leaving a pop bottle. In the anthracite region, such belchings have dislodged men who were pumping water from shafts, causing them to fall into the water.

It might be expected that when the water is lowered back down to the level where, on rising, it first entered a place and began to compress the air, it will have lost all its pressure, but it is a fact that the ribs will emit methane and increase the volume of a

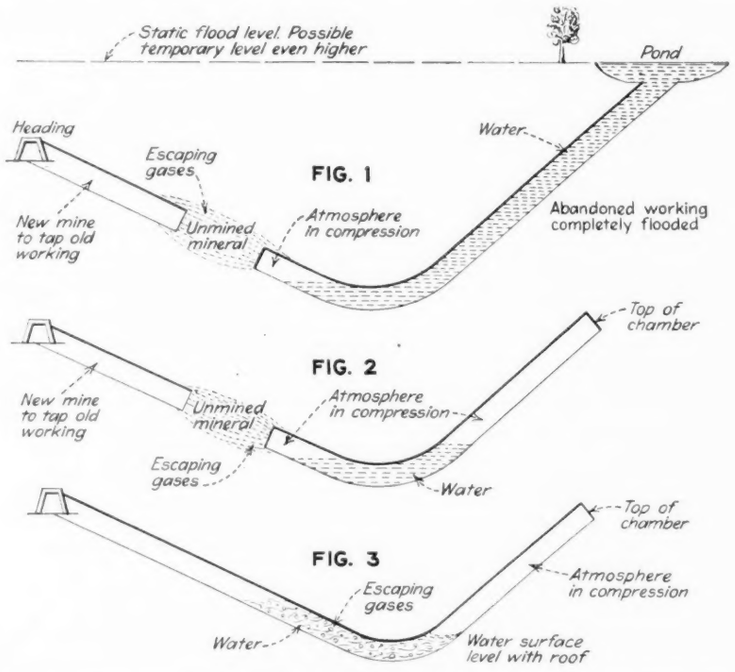


Fig. 1—Shows abandoned working fed by pond on surface. Here the water has a pressure that will push it above the heading in the new mine even if it escapes slowly and will carry it still further if an extensive breach is made suddenly through the pillar between the two mines. Fig. 2—Here the atmosphere is compressed on both sides of the water. Fig. 3—Mines have been connected and water has been pushed to the left of the dip by the greater compression of the atmosphere to the right. It may throw out the water as a whole toward the heading like liquid from a geyser, mineral-water siphon or pop bottle.

* Continued from p. 59, *Coal Age*, August, 1941.

mine atmosphere even when under compression. Hence, air pressure may be in evidence where, in the filling of the place, no water pressure existed. On the other hand, this pressure may be quite considerably reduced by leakage of the mine atmosphere through the measures as a result of the pressure when the water level was still high, in which case, instead a pressure, there might be a tendency toward a partial vacuum as a result of dewatering. This "vacuum" will merely cause the water to be lower on the side where the pumps are located than on the opposing side.

It is likely that the abandoned mine, if badly flooded, may have atmospheres under high pressure at the face of all the workings including those adjacent to the operating mine, and this compressed atmosphere will leak into the approaching workings of the latter mine and perhaps even into a heading skirting the old workings.

Mines free of methane often become gassy when beds below become flooded, and some have had to install safety lamps to meet that condition. Here no more than one bed is under consideration, but the result is the same.

It is well, therefore, to look for methane when approaching or skirting an abandoned and flooded mine, so as to provide for escaping gases, because air, especially under boiler-like pressures, will flow through pillars of coal and rock measures with some freedom. Either water or gases driven through these may loosen material and cause falls of top, face or sides.

Also, it is well to remember that the belchings that occur usually are full of methane, so that when water is being lowered in a flooded mine, the methane will come in spurts, and then the air around the pump may be almost methane-free until another point is reached from which a belching is possible.

After Fan Has Stopped

Q.—Where the ventilation is not continuous, what does the law require before anyone can enter the mine?

A.—According to the law of 1941, if the State inspector has given the management permission to stop the fan for a certain definite period every 24 hours, that fan must be restarted a "sufficient length of time" before any person is scheduled to enter the mine so that the atmosphere of the workings will be clear of "explosive, poisonous and noxious gases"; see Sec. 57.

In that section nothing is said as to men, other than the "mine foreman, assistant mine foreman or fireboss," entering a gassy mine after the fan has been shut down, either because of a definite suspension of work, damage to the machinery or other unavoidable cause, but Sec. 127 provides that any person being ordered by the mine foreman to withdraw from the mine because the ventilation is interrupted shall not reenter the mine until given permission to do so after a thorough inspection has been made and the mine is found by the mine foreman to be in good and safe condition (see Sec. 127). Thus, the law requires that no one but the officials named shall enter the mine, gassy or non-gassy, until one or all of them shall have made an inspection and found the mine safe, unless the fan stoppage was at a time and for a period already prescribed by the mine inspector.

Questions, Mine Examiners' Examination State of Illinois, 1940*

Q.—State how you, as mine examiner, would make an examination of a coal mine.

A.—Having cleaned, properly assembled and carefully examined the safety lamp to be used in making the examination, I would start to the mine in plenty of time so that I can complete a thorough examination before morning when the men are scheduled to enter the mine. Before entering the mine, however, I would ascertain that the fan is working properly. This done, I would proceed at once to the foot of the downcast shaft or the intake airway and observe whether the usual quantity of air is passing into the mine. Having reached my district, I would enter and examine each working place in order, following the air current from place to place, making a special test for gas in each place, and examining the roof and coal to ascertain that they are in a safe condition for operation. In each place examined I would mark the date on the wall as evidence of my visit.

Where methane is found, it should either be removed at once, by erecting the necessary brattice to deflect the air current and thus compel it to sweep the place where the gas is lodged; or, if this is not done, all entrances to the place must be safeguarded by a proper danger signal that will warn men not to enter.

In this manner, I would proceed through the district, examining not only the working face in each room and heading but also the edges of all falls and the accessible parts of abandoned workings. Having completed the rounds, I would make a full record of the examination in the book for that purpose, noting those places where danger of any kind has been found and explaining its nature. This I would complete before any men are permitted to enter the mine for work. Finally, I would take from the board all checks belonging to miners whose places I have found unsafe for men to work in, and I would deliver such checks to the mine manager, who should not permit the men to enter until their working places are made safe for work.

Q.—On your examination of a mine generating explosive gases, you find the ventilation in good condition and no place containing any accumulation of methane; but as you are about to admit the workmen you discover the ventilation has been interrupted by the stopping of the fan or some other cause; what would be your method of procedure?

A.—The men should be notified promptly that they cannot enter the mine, until the fan has been started, until another examination has been made and the working places reported safe for work. If the mine is generating much methane, any interruption of the circulation, by the temporary stopping of the fan, may create a dangerous condition in one or more working places. The fireboss must take no chances, as he would do if he allowed the men to enter the mine without examination after a temporary interruption of the circulation. He must assure himself that there is no danger before he allows his men to return to work.

* Continued from p. 80, *Coal Age*, June, 1941.

Questions, Mine Foremen's Examination Bituminous, Pennsylvania, 1941*

Q.—What are the necessary requirements in the installation, operation and maintenance of conveyors when used in rooms and entries?

A.—All conveyor headings shall be provided with a minimum width and height of not less than 4 ft. for travel, but where track is installed in such headings the minimum clearance shall not be less than 2½ ft., which space shall be continuous throughout the heading. All such travel and clearance space shall be kept free underfoot of all forms of obstruction, and free from electric wires and electric cables.

A space not less than 4 ft. wide must be provided for travel from the immediate entrance to the face of each working place, which space also shall be kept free of all obstruction under foot and free from electric wires and cables.

At all points where men must cross a conveyor, such arrangements must be made as will permit them to cross it safely and conveniently without coming in contact with it. All conveyors in working places shall be stopped while mine officials make their examinations, and shall so remain until the examination is completed.

In dry areas and in gassy sections of conveyor areas, the exterior surfaces of all electric motors and cables shall be cleaned of all coal dust once in each operating shift, and all electric equipment in areas of that character shall be thoroughly examined by a competent person once each calendar day when such equipment is used; a written report of the condition of such equipment shall be made by the person making the examination, which report shall also give an identification number of the piece of equipment examined. This report shall be kept in a book furnished by the operator or superintendent, and shall be preserved for one year.

All electric wires or electric cables in completed portions of conveyor headings shall be carried on insulators and all electric cables constantly kept in rooms or pillars or other working places shall be carried on suitable supports to within 70 ft. of the face of each working place. All electric equipment and conductors shall have sufficient size and power for the work they may be required to do, so installed, worked and maintained as to reduce to a minimum the danger from accidental shock or fire and shall be of such construction and so worked that the rise in temperature caused by ordinary working will not injure their insulating material. (6 per cent.)

* Continued from p. 59, *Coal Age*, August, 1941.

WHAT'S NEW IN OPERATING IDEAS

Track Items Fabricated By Welding Methods

Mine frogs are built with a cutting torch and electric welder by Emile Kemper, Seymour Coal Mining Co., Herrin, Ill. Fig. 1 shows the first welding step—note the arrow point at the extreme right end. The next step is to bend the marked end to the left until lines constituting the arrow point line up with the two wing rails. This brings the web of the rail directly under the point position. The point is finished by cutting away the flange and head with a torch and grinding the rough edges down on an emery wheel.

The wings having been bent to shape at the forge, the parts are assembled on a baseplate and welded to it. Holes and notches burned in the baseplate for spikes finish the job (Fig. 2).

The problem of wheels taking the wrong lead at the frog, where a very short switch requiring a No. 2 frog was necessary, was solved at the Buckhorn mine, Consolidated Coal Co., Herrin, by welding a guide to the top of the frog, as shown in Fig. 3.

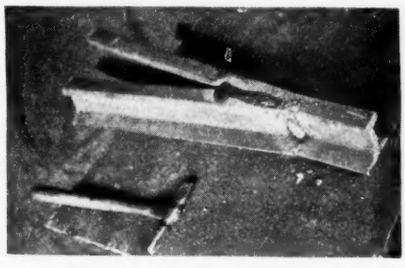


Fig. 1—First welding step in making a frog at Seymour. Note arrow for use in later bending operation.

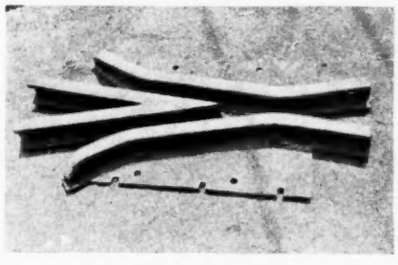


Fig. 2—Completed frog used at Seymour.

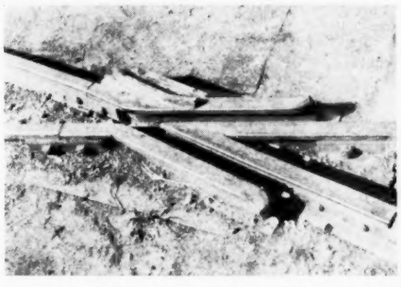


Fig. 3—Guide welded to top of frog at Buckhorn to prevent wheels taking the wrong lead.

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Broken Studs Quickly Removed By Arc-Welding Method

It was but 15 minutes until the work whistle blew at Harrisburg No. 43 mine, Peabody Coal Co., Harrisburg, Ill., when a broken stud in the pillow block of the engine-generator set threatened to slow down the get-away for the day's work. James H. Richardson, electrician, grabbed a ⅝-in. bolt and insulated the body with asbestos, holding it in place with friction tape. He then wrapped a cotter-key-shaped copper strip around the bolt under the head.

Examples of stud-removal by arc-welding at Harrisburg No. 43.

Dragging a welding cable from the shop to the engine room, he quickly clamped the copper strip into the electrode holder. Dropping the insulated bolt onto the broken stud, he drew a heavy arc, shoved the bolt down onto the stud and jerked off the electrode holder. With the bolt welded to the stud, it was but a matter of seconds to remove it. When the whistle blew, a new stud was in place.

The same procedure for small and large broken studs is routine at this mine. The small stud shown in the illustration is from the front clutch case of a Joy loading machine. The contact piece in this case is the discarded stub end of a welding electrode, with the end turned at right angles to serve as a handle to unscrew the broken stud.

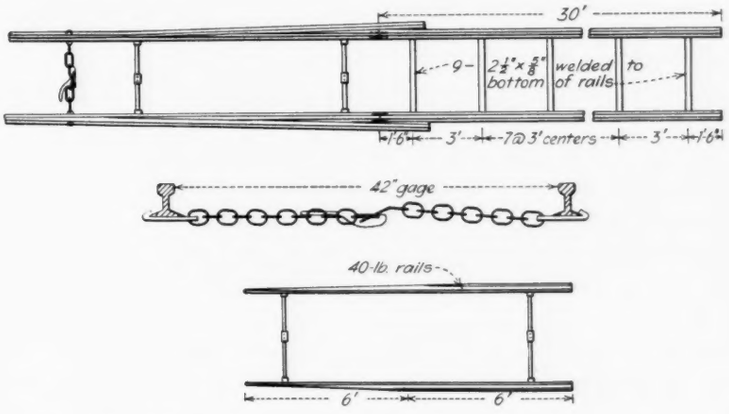
•

Track Extended at Working Face By 30-Ft. Sliding Section

To keep track to the working face, a 30-ft. sliding extension is used at the Union Pacific Coal Co. mines in Wyoming. This extension is described in a paper on development with and against the pitch presented before the February (1941) meeting of the American Institute of Mining and Metallurgical Engineers, and also at the 1941 meeting of the Rocky Mountain Coal Mining Institute, by John E. Wilson and Frank P. Lebar, Union Pacific resident engineers.

Temporary track in development work is 40-lb., which is replaced by 75-lb. steel as openings advance. To take care of advances as the face moves ahead, the sliding extension shown in the accompanying illustration is employed. The extension consists of two 30-ft.-long rails welded to cross members. These rails are joined at the rear to switches 12 ft. long.

The sliding extension is installed by placing the switches inside the regular 40-lb. rails, which then are pulled together just back of the switches by means of a chain-and-toggle-type lever, thus locking the sliding extension in place.

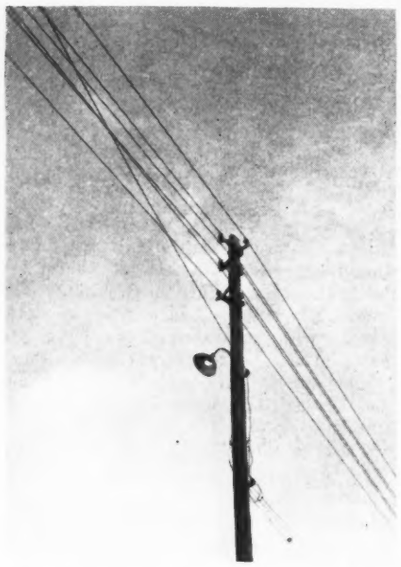


Details of sliding track extension for use with mobile loaders.

Less Copper Is Installed Yet Line Loss is Lower

The two-mile power-transmission line between the two mines of the Bell & Zoller Coal & Mining Co., Zeigler, Ill., is made up of two circuits to reduce the line drop. Compared with a single 500,000-cir.mil circuit, the double-circuit construction (4/0 conductors) saves 15 per cent in copper and 45 per cent in voltage drop. This seeming paradox is due to that strange and comparatively unrecognized factor called reactance.

A direct-current circuit has only ohmic resistance to limit the flow of current, but in alternating-current circuits both ohmic and reactive resistance have to be taken into account. In handbook tables, both are listed in terms of ohmic resistance, or rather in volts loss per 1,000 ft. per ampere, which



Bell & Zoller pole line (length, about 12,000 ft.; voltage, 2,300; load, about 1,000 kw.; wires, 4/0; spacing, 24 in.).

amounts to the same thing. The usual tables are not made up to be used directly for three-phase circuits, unless the fact that both ohmic and reactive resistance of such circuits are but 1.73 times the resistance of a single wire of that circuit is taken into account.

Spacing of wires has a great influence on the value of reactance; the diameter of the wires a lesser. Both must be taken into consideration. The brief accompanying table illustrates this variation. Within the limits of this table, it will be noted, reactance has a far greater influence on line drop than resistance.

Actual line drop between wires in a three-wire transmission line carrying a balanced load (wires spaced in an equilateral triangle) is found by the formula:

Volts drop between lines —

$$\frac{I \times Z \times \sqrt{3} \times l}{1{,}000}$$ in which

I = current per phase,
Z = impedance, and
l = length of line in feet.

Impedance, which is the total resistance to the flow of the current, is found from the following formula (values for R and X taken from the table):

$$Z = \sqrt{R^2 X^2}$$, in which

R = resistance in ohms, and
X = reactance in ohms.

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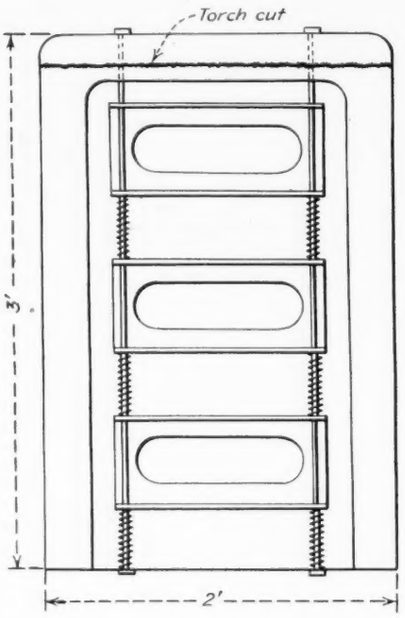
Remodeling Haulage Locomotive Eases Resistor Replacement

To facilitate the replacement of resistors in original models of the Goodman Type MS-6 locomotive, writes P. C. Ziemke, Milwaukee, Wis., the tops of the resistor cases were cut off with a torch. Of the positive four-wheel-drive type, these locomotives were built without springs and consequently the resistor grids are spring-mounted to prevent breakage.



Showing how top of casting was cut off to facilitate installing grids.

These grid sections were put in place through an opening in the side of the resistor case. Each section had a set of four coil springs underneath it and the stack was held in place by four through bolts secured in the top and bottom of the case.

"Getting these grid sections and coil springs all properly decked to permit passing the bolts through usually proved to be an irksome and time-consuming job. We therefore improved on the situation by carefully cutting the entire top of the casting squarely off with the oxyacetylene torch. Then, four $\frac{3}{16}$x2-in. straps were welded to the lower edge of the improvised lid section. These overlapped the torch cut and prevented any side motion.

"The four through bolts were tacked with the arc welder to the bottom of the case to hold them rigid and prevent them from moving when the upper nuts were turned. With the new arrangement, removing a defective section and replacing it consumed only one-third the time previously required to juggle the heavy sections laboriously into place from the old side opening."

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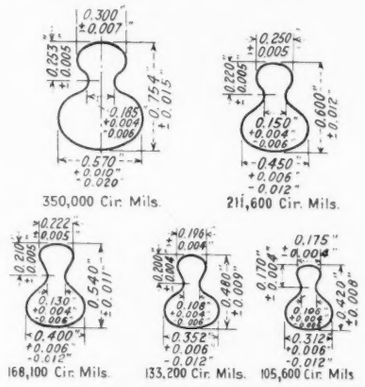
Jewels

The more jewels, the better a watch runs. Ideas, in turn, might be likened to watch jewels, inasmuch as they make operations smoother and more efficient. Operating, electrical, mechanical and safety men around the mines naturally produce ideas of their own and also are in the market for others from outside. This Operating Ideas department consequently is conducted to bring you the new ideas of others and pass yours on to them. So if you have one that has saved you money or promoted safety, here is the place for it. Include a sketch or photo if it will help to make it clearer. For each acceptable idea, Coal Age will pay $5 or more on publication.

Standard Trolley Wires Improve Efficiency

For maximum installation efficiency and convenience, copper trolley-wire purchases should be specified in accordance with the standards adopted in 1940 by the American Society for Testing Materials, states a recent issue of *O-B Haulage Ways*. Because standardization is an important factor in operation and maintenance, drawings showing standard wire



Dimensions to be Used by the Die Maker

	350,000 Cir. mils.	211,600 Cir. mils.	168,100 Cir. mils.	133,200 Cir. mils.	105,600 Cir. mils.
A –	0.359"	0.300"	0.300"	0.240"	0.210"
B –	0.205"	0.130"	0.110"	0.100"	0.090"
C –	0.075"	0.075"	0.060"	0.050"	0.050"
D –	0.188"	0.175"	0.160"	0.140"	0.110"
E –	0.075"	0.075"	0.070"	0.070"	0.060"

A, B, & D Dimension tolerance ± 0.016"
C & E Dimension tolerance ± 0.008

Standard Figure-8 trolley-wire sections.

Table of Ohms, or Volts Drop per Ampere per 1,000 Ft., of Single Conductor

Wire Size	Ohms	Reactance for Various Wire Spacings — 6 In.	12 In.	18 In.	24 In.
500,000 cire. mils	0.0207	0.071	0.0864	0.0957	0.1023
350,000 cire. mils	0.0296	0.0746	0.0905	0.0998	0.1064
4/0	0.0489	0.0805	0.0964	0.1067	0.1123
3/0	0.0617	0.0832	0.0991	0.1084	0.1150
2/0	0.0778	0.0858	0.1017	0.1110	0.1176
1/0	0.0981	0.0885	0.1043	0.1136	0.1202
No. 1	0.1237	0.0911	0.1070	0.1163	0.1229
No. 2	0.156	0.0938	0.1097	0.1190	0.1256
No. 4	0.248	0.0991	0.1150	0.1243	0.1309

SUPER LUMPS *Hold No Terrors* FOR U.S. RUBBER BELTS

Here, in one of the largest mines in the country, a 30-inch U. S. MATCHLESS Mother Belt is being ruthlessly bombarded by two 18-inch U. S. MATCHLESS anti-drag room belts. Then, under low ceilings, over uneven floors, the coal moves steadily, speedily and efficiently on its 2000-foot trek to the cars.

And it's because U. S. Conveyor Belts are able to take such thorough-going beatings... because, day after day, they absorb this terrific kind of punishment and return doggedly for more... *because they are so constructed that they cannot be affected by mildew* — that more and more U. S. Conveyor Belts are being specified by mine operators and builders of belt conveyor systems.

We are always glad to furnish details of such installations, and to work with you and your engineers on your conveyor problems.

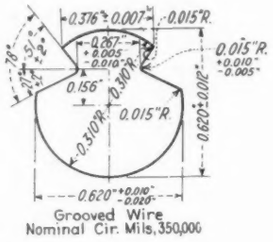
SERVICE BEYOND PRICE AND SPECIFICATIONS

United States Rubber Company

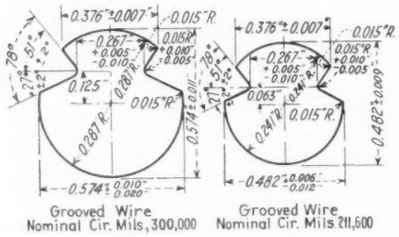
1230 Sixth Avenue, Rockefeller Center, New York, N. Y.

sections, as taken from the A.S.T.M. publications, and certain of the tabulated data (Table I) are reproduced here.

Trolley wires larger than 4/0 came into use in 1925, and for years thereafter there was a lack of standardization and some confusion as to nominal and actual sizes. The first of the large wires was spoken of as 6/0, but none of the wire tables available to the electrician on the job showed the circular-mil area of such a size. Calculations to expand the American Wire Gage (A.W.G.)

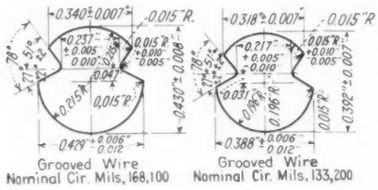


Grooved Wire
Nominal Cir. Mils, 350,000



Grooved Wire
Nominal Cir. Mils, 300,000

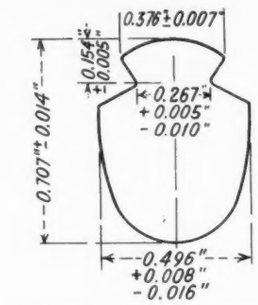
Grooved Wire
Nominal Cir. Mils 211,600



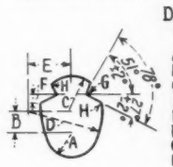
Grooved Wire
Nominal Cir. Mils, 168,100

Grooved Wire
Nominal Cir. Mils, 133,200

Standard grooved trolley-wire sections.

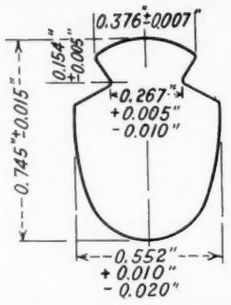


Nominal Area, Cir. Mils. 350,000

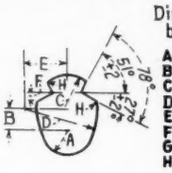


Dimensions to be used by the die maker

A – 0.208"	±0.005"
B – 0.189"	±0.005"
C – 0.310"	±0.005"
D – 0.671"	±0.016"
E – 0.423"	±0.008"
F – 0.066"	±0.005"
G – 0.015"	±0.868"
H – 0.015"	±0.868"



Nominal Area, Cir. Mils. 400,000



Dimension to be used by the die maker

A – 0.232"	±0.005"
B – 0.203"	±0.005"
C – 0.310"	±0.005"
D – 0.700"	±0.016"
E – 0.423"	±0.008"
F – 0.080"	±0.005"
G – 0.015"	±0.868"
H – 0.015"	±0.868"

Standard Figure-9 deep-section grooved trolley-wire sections.

tables show the 6/0 size to be 336,456 cir. mils (Table II).

Much of the so-called 6/0 trolley wire was of two other sizes: either 300,000 or 350,000 cir.mils. Later, when haulage and mining loads increased, a still larger size was found desirable. The result was a still larger wire (400,000 cir.mils) made up in a new style termed the "Figure-9 deep-section." Confusion in a few instances resulted in the new wire being mistakenly referred to as No. 9/0, which, according to the expanded A.W.G. table (Table II) would have an area of 674,583 cir.mils. In this connection, it might

Table II — A.W.G. Large-Wire Sizes, Including Five Calculated Sizes Larger Than 4/0

Number A.W.G.	Area, Cir.Mils	Diameter, if of Round Section, Mils	Diameter, if of Round Section, In.	Calculated Weight, per 1,000 Ft.
Table:				
1/0	105,600	324.9	0.3249	319
2/0	133,100	364.9	0.3649	403
3/0	167,800	409.6	0.4096	508
4/0	211,600	460.0	0.4600	641
Calculated by A.W.G. Geometrical Progression — Not Standard Wire Sizes:				
5/0	266,822	516.54	0.51654	808
6/0	336,457	580.05	0.58005	1,020
7/0	424,243	651.34	0.65134	1,287
8/0	534,976	731.42	0.73142	1,620
9/0	674,583	821.33	0.82133	2,040

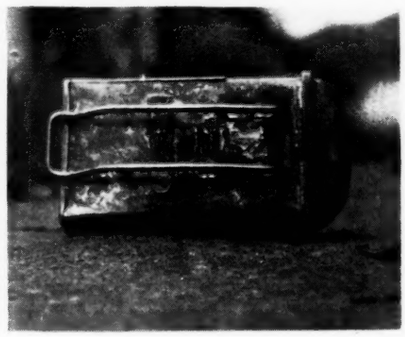
be pointed out that the last five items in Table II have been inserted only to indicate what would be the areas of numbered sizes greater than 4/0.

The first column in Table I ("Nominal Area, Cir.Mils") gives the proper size designations for copper wires which are now standard. Conscientious manufacturers of clamps and other trolley-wire fittings design and check them to fit the wires listed in Table I and shown in detail in the accompanying cross-sectional drawings. Copies of the standard specifications for trolley wires are available at 25c. each from the American Society for Testing Materials, 260 South Broad St., Philadelphia, Pa. B47-39 covers round and grooved wires and B116-40 covers Figure-9 deep-section grooved and Figure-8 wires. Another standard (B9-39) covers bronze trolley wire in round and grooved sections. Wire of A-grade bronze is 45 to 50 per cent stronger than hard-drawn copper trolley wire.

•

Holder Put on Self-Rescuer Lessens Chance of Damage

Pointing out that a self-rescuer should not receive any more bumps than absolutely necessary, since they may break the seal and let in air, rendering the "Hopcalite" useless, C. E. Jones, conveyor foreman, Kopperston (W. Va.) mine, Koppers Coal Co., suggests equipping them with a supplementary holder, as shown in the accompanying illustration. This holder is made by bending welding rod or heavy, stiff wire and soldering it to the self-rescuer case.



Showing holder soldered to self-rescuer case.

The holder, as compared with the belt loop with which the rescuer originally is supplied, permits the rescuer to move up or sidewise when struck, says Mr. Jones, thus reducing the force of the blow and lessening the likelihood of puncturing the case. Also, the holder permits placing the rescuer in the belt any desired place around the body, and also allows it to be removed from the belt quickly in case it should become necessary to use it.

Table I—A.S.T.M. Standards and Calculated Data for Copper Trolley Wire

Nominal Area, Cir.Mils	Nominal Gage Equivalent	Actual Area, Sq.In.	Based on Design — Calculated Weight, Lb. per 1,000 Ft.	Based on Design — Calculated Weight, Lb. per Mile	Actual Area, Cir.Mils
Grooved:					
350,000*	....	0.2758*	1,063	5,612*	351,200*
300,000*	....	0.2355*	907	4,792*	299,800*
211,600*	4/0	0.1665*	641	3,389*	212,000*
168,100*	3/0	0.1314*	506	2,674*	167,300*
133,200*	2/0	0.1083*	417	2,205*	137,900*
Figure-9 Deep-Section Grooved:					
350,000*	....	0.2740*	1,056	5,576*	348,900*
400,000*	....	0.3120*	1,202	6,347*	397,200*
Figure-8:					
350,000*	....	0.2750*	1,060	5,597*	350,100*
211,600*	4/0	0.1662*	640	3,382*	211,600*
168,000*	3/0	0.1318*	507	2,682*	167,800*
133,200*	2/0	0.1045*	404	2,127*	133,100*
105,600*	1/0	0.0829*	319	1,687*	105,600*

* Figures from A.S.T.M. Standards.

Note: 1 mil equals 0.001 in.; 1 sq.in. equals 1,000,000 sq.mils; 1 sq.in. equals 1,273,000 cir.mils.

WHAT'S NEW IN THE FIELD

Hearing on Proposal for Maximum Coal Prices To Be Held by Bituminous Division

A PUBLIC hearing on a petition filed by the Bituminous Coal Consumers Counsel, Luther Harr, calling for establishment of maximum prices for bituminous coal under the Bituminous Coal Act, will be opened Sept. 9 at Washington, D. C., by the Bituminous Coal Division. C. R. Larrabee, chief of the Division's Trial Examiners' Section, will preside at the hearing. An order issued by Division Director Howard A. Gray provides that evidence will be received at the hearing as to allegations by the Consumers' Counsel that:

1. Consumers are being seriously injured by excessive and oppressive coal prices in many markets, which in many instances approach the proportions of profiteering, and by fear of still higher prices.

2. Present abuses, and graver ones which threaten, can be rectified and prevented only by immediate establishment of maximum prices.

3. Such maximum prices should be established at increases approximately 10 per cent of the estimated realization for each district under the presently effective minimum prices established by the Division.

4. An expeditious procedure should be formulated for hearing bona fide and legitimate claims of code member producers who seek special higher maximum prices for themselves, alleging that the general maximum prices would not yield them a fair return on the fair value of their property.

Must Give Basis of Interest

The order provides that each person who desires to participate in the proceeding must file a petition of intervention with the Division stating "with particularity and in detail" his status and interest, his position regarding the four issues in the hearing, and matters relied upon in support of his position.

The increases above current minimum prices at which the petition proposes the maximum prices be set follow:

District and Location	Increase Per Ton Above Minimum Prices
District 1 (central Pennsylvania, Maryland and northern West Virginia)	$0.20
District 2 (western Pennsylvania)	.20
District 3 (northern West Virginia)	.20
District 4 (Ohio)	.20
District 5 (Michigan)	.40
District 6 (northern West Virginia Panhandle)	.20
District 7 (southern West Virginia and Virginia smokeless field)	.20
District 8 (southern West Virginia, eastern Kentucky, western Virginia, northeastern Tennessee)	.20
District 9 (western Kentucky)	.15
District 10 (Illinois)	.20
District 11 (Indiana)	.20
District 12 (Iowa)	.30
District 13 (Alabama, Georgia, southeastern Tennessee)	.25
District 14 (Arkansas-Oklahoma field)	.35
District 15 (Missouri-Kansas-Oklahoma field)	.20
District 16 (eastern Colorado)	.30
District 17 (western Colorado, part of New Mexico)	.25
District 18 (Arizona-New Mexico)	.30
District 19 (Wyoming-Idaho)	.20
District 20 (Utah)	.25
District 22 (Montana)	.15
District 23 (Washington-Oregon)	.35

Dr. Harr moved on Aug. 2 to bring under strict supervision the price-fixing activities of 14 coal-marketing agencies said to control 30 per cent of the nation's commercial tonnage. This action, by petition filed with the Bituminous Coal Division, followed by ten days his petition asking establishment of maximum prices for bituminous coal producers generally, whether or not they are members of marketing agencies.

The Division also has set hearings on orders directing the following agencies to show cause why regulations governing them should not be tightened and machinery set up for establishing maximum prices for their coals, when necessary for protection of the consuming public: Appalachian Coals, Inc., Cincinnati, Ohio; Alabama Coals, Inc., Birmingham; Belleville Fuels, Inc., Terre Haute, Ind.; Arkansas-Oklahoma Smokeless Coals, Inc., Fort Smith, Ark.; Middle States Fuels, Inc., Terre Haute, Ind.; Smokeless Coal Corporation, Charleston, W. Va.; Southern Illinois Coals, Inc., Chicago; Kentucky Coal Agency, Inc., Madisonville, Ky.; Southwest Coal Co., Kansas City, Mo.; Western Pennsylvania Coal Corporation, Pittsburgh; Fairmont Coals, Inc., Fairmont, W. Va.; and Brazil Block Fuels, Inc., Terre Haute, Ind.

Code memberships have been restored to the Beckley Fire Creek Coal Co., Charleston, W. Va.; New River Co., Mount Hope, W. Va., and W. M. Buckles and C. C. Compton (a partnership), Swords Creek, Va. These memberships had been revoked for violations of the Coal Act and regulations, being restored on payment of taxes. The division revoked the code membership of Charles Janeway, Middlesboro, Ky., and dismissed a complaint against the Lumaghi Coal Co., St. Louis, Mo. A cease and desist order was issued to restrain R. I. Senters, Whitesburg, Ky., from further violations following a hearing at Big Stone Gap, Va.

W. A. Shipman, a Division trial examiner, has recommended that the code membership of E. D. Long, trading as E. D. Long & Sons, Perry, Mo., be revoked and that the producer be required to pay taxes totaling $597.86 as a condition of having his membership restored. The complaint against the producer, charged with violating the Coal Act and regulations by selling coal below minimum prices and by shipping it by rail, although no minimum prices for such shipments had been established for his coal, was filed by District 15 board (Kansas City, Mo.).

Minimum Set for Truck Hauls

The Division has issued a final order establishing a special minimum price of $2 per ton at the mine for truck shipments of all sizes of coals produced in western Pennsylvania (District 2) for use in beehive coke ovens in Market Area 7, which covers most of western Pennsylvania. Evidence in a public hearing showed that as a result of the national defense program about 3,000 beehive coke ovens have been placed in operation in western Pennsylvania, principally in the Connellsville area. Coke manufacturers find it necessary to have the coal transported by truck to facilitate handling it at the ovens.

The Division has issued an order denying the request of the Producers' Board for District 15 (Kansas City, Mo.) for the establishment of a new size group of minimum prices which would permit producers in the Kansas-Missouri-Oklahoma field to sell "washed $\frac{3}{8}$x0-in. screenings" at minimum prices 20c. per ton below those for "washed $1\frac{1}{4}$x0-in. screenings."

An order has been issued cancelling provisions in the minimum price schedules for District 13 (Alabama, part of Tennessee and Georgia) which had authorized reductions of 35c. per ton in minimum prices for shipments of coal to Alabama City, Ala., which previously had been allowed to enable producers to meet natural-gas competition in that city. Cancellation of the provisions was asked by the Bituminous Coal Producers Board for District 13, Birmingham.

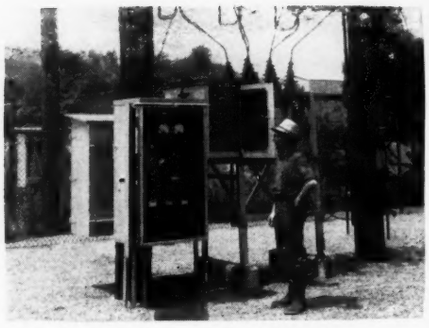
An order denying a requested reduction of 20c. per ton in the minimum prices at the mines for low-volatile coals shipped from

Coming Meetings

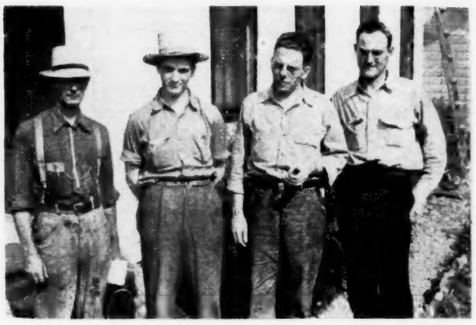
- National Safety Council: 30th National Safety Congress and Exposition, Oct. 6-10, Stevens Hotel, Chicago, Ill.
- Coal Producers' Association of Illinois: annual meeting, Oct. 14, Springfield, Ill.
- Ohio Valley Section, A.I.M.E., and Open Hearth Steel Committee: Oct. 17-18, Columbus, Ohio.
- Fifth annual joint Fuels Conference under auspices of Coal Division of A.I.M.E. and Fuels Division of A.S.M.E.; Oct. 30-Nov. 1, Hotel Easton, Easton, Pa.
- Illinois Mining Institute: 49th annual meeting, Oct. 31, Hotel Abraham Lincoln, Springfield, Ill.
- West Virginia Coal Mining Institute: annual meeting, Nov. 7 and 8, Hotel Morgan, Morgantown, W. Va.

COAL MEN ON THE JOB

Russell Mencer, superintendent for R. L. Griggs, Pa.lett, Ohio.

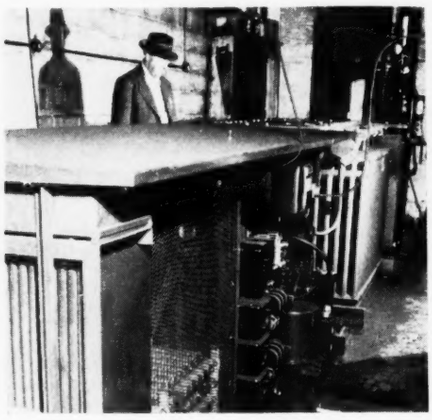


Ralph Erhard Jr., electrical engineer, Jefferson Co., Bloomingdale, Ohio.

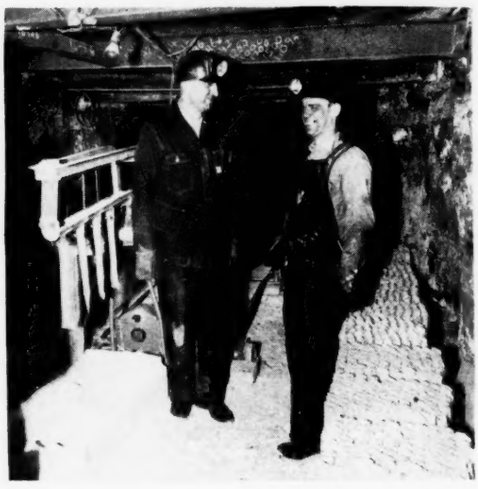


W. A. McNary (left), Wilson Dorff, A. D. Henry and Paul Wease, Jefferson Co.

R. D. Squibb and A. C. E. Roberts, mine foreman, Dorothy mine, Youghiogheny & Ohio Coal Co., Glen Robbins, Ohio.

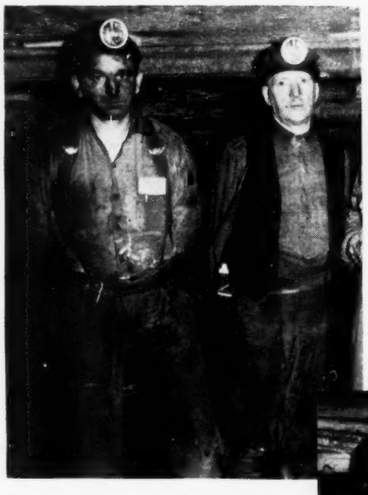


S. C. Holcomb, electrical engineer, Rail & River Coal Co., Dilles, Ohio.



Victor Bizzari, face boss (left), and John Boyd, mine foreman, Camel Run mine, Warner Collieries, Co., Fairpoint, Ohio.

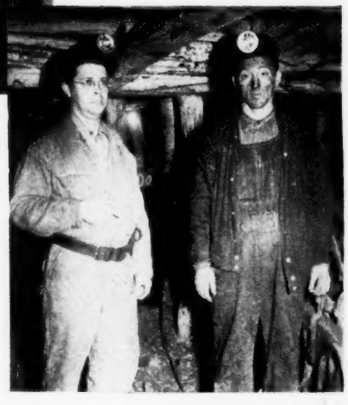
Louis Ferry, supervisor of mechanical mining (standing, second from left), with part of day force, No. 3 mine, Rail & River Coal Co., Dilles, Ohio.



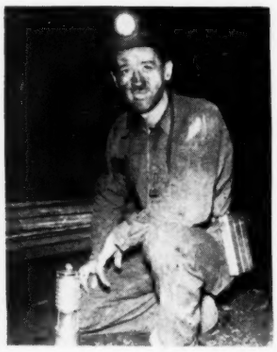
J. A. Buchanan, superintendent, and J. B. Albasin, chief electrician, Dorothy mine, Glen Robbins, Ohio.

James Anderton, assistant foreman (left), and W. M. Kelly, mine foreman, Crow Hollow No. 1 mine, Bradley, Ohio.

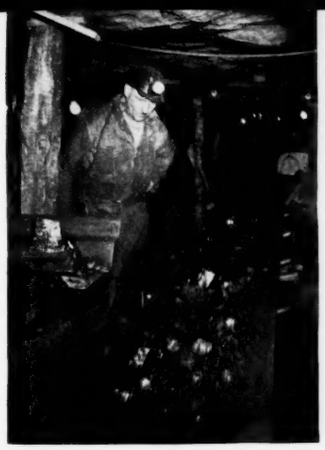
J. D. McHugh (left), mining engineer, United States Coal Co., Bradley, Ohio, with Fred Strauss, assistant foreman, Crow Hollow No. 1 mine.



Left—Gilbert Miller, shop foreman, Crow Hollow No. 1, United States Coal Co., Bradley, Ohio.



Left—Joe Emery, face boss, Rail & River No. 3 mine, Rail & River Coal Co., Dilles, Ohio.

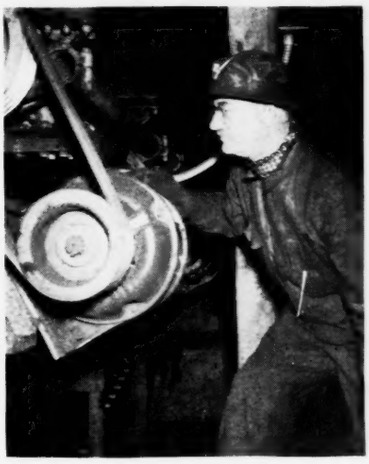


Ray Cobb, superintendent, North Diamond mine, West Kentucky Coal Co., Earlington, Ky.

Sherman Melton, chief electrician, West Kentucky Coal Co., Sturgis, Ky.

Alexander Fleming, chief chemist, West Kentucky Coal Co., Earlington, Ky.

Thomas Peyton, general mine foreman, No. 11 seam, North Diamond mine, Earlington, Ky.



F. R. Buckley, assistant chief engineer, West Kentucky Coal Co., Sturgis, Ky.

Aubin Higgins, mining engineer, Earlington (Ky.) office, West Kentucky Coal Co.

T. C. Stokes, assistant chief electrician, West Kentucky Coal Co., Sturgis, Ky.

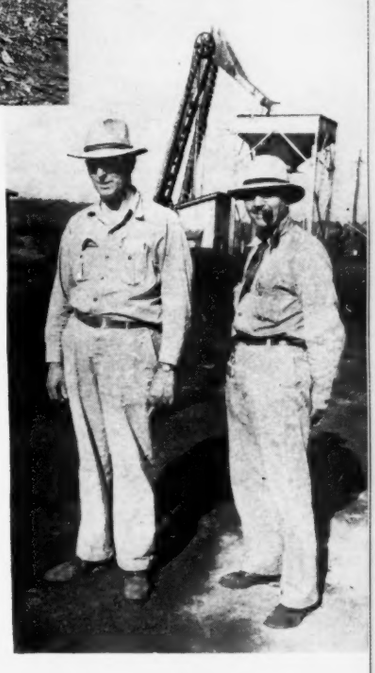
E. G. Schell, superintendent, Blaine (Ohio) mine, Lorain Coal & Dock Co.

Ray Reppart, chief electrician, Blaine mine, Lorain Coal & Dock Co.

James Rumely (right), superintendent, Fairpoint Const. Co., St. Clairsville, Ohio, with Fred Hall and Arthur Baker.

E. E. Smith (left), superintendent, and C. J. Vincent, electrical engineer, Industrial Coal & Iron Co., Hopedale, Ohio.

J. S. Harmon, superintendent, and A. T. Swelbar, pit foreman, Georgetown No. 12 mine, Hanna Coal Co. of Ohio



BY EDITORS ON THE JOB

mines in Virginia and West Virginia (Districts 7 and 8) to off-line railroads for locomotive fuel has been issued. The reduction was sought by District 7 board, which contended that the cut was necessary to enable its mines to retain off-line locomotive fuel business they formerly enjoyed. The board also asserted it would permit the sale of West Virginia and Virginia low-volatile coals for locomotive fuel use in St. Louis and other cities where anti-smoke ordinances are creating a new demand for "smokeless" coal.

A temporary order has been issued granting temporary relief, permitting producers in District 10 (Illinois) to charge minimum prices for river shipments in selling coal to retail dealers in Minneapolis and St. Paul, Minn., where the coal is delivered to dealers by barge, either to or over the Twin Cities municipal coal docks. The order is effective pending final decision on a petition filed by three Illinois producers asking immediate temporary relief and the establishment of permanent river prices for deliveries f.a.s. the docks to the dealers.

The producers, the Delta Coal Mining Co., Kansas City, Mo.; Sahara Coal Co. and the United Electric Coal Cos., contend that establishment of minimum prices for f.a.s. delivery is necessary to permit them to take advantage of cheaper river transportation costs and sell coal in the Twin Cities in competition with coals shipped into that area from other fields via Great Lakes docks.

Certain interveners, particularly the District 7 Producers' Board (representing the Virginia-West Virginia smokeless field), opposed the petition in a hearing before Trial Examiner W. A. Cuff.

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To Reopen Idle Collieries

Pine Knot and Thomaston collieries, formerly operated by the Philadelphia & Reading Coal & Iron Co. in the Heckscherville Valley, southern anthracite region of Pennsylvania, are to be reopened by the Pine Hill Coal Co. According to an announcement by W. Parke Millington, trustee for the latter company, which operates the Oak Hill mine, a loan of $140,000 has been obtained from the Reconstruction Finance Corporation.

•

Chain Belt Completes 50 Years

On Sept. 9 Chain Belt Co., Milwaukee, Wis., will look back on 50 years of progress and achievement. Founded in 1891 to produce an improved type of detachable chain, then used largely on agricultural machinery, it has since expanded its activities until today it is among the largest producers of chain belts, construction machinery, elevating and conveying equipment and other related products.

•

To Operate Captive Mine

Gulf, Mobile & Ohio R.R. has purchased the property of the Illinois-Missouri Coal Co., at Sparta, Ill., and some additional coal acreage, and will operate the property as a captive mine. The mine will be operated by the railroad in its own name, and a number of improvements still to be worked out will be made.

British Research Board Reports on Excursions In Rock-Dusting, Roof Support, Haulage

SOMEWHAT belatedly the Safety in Mines Research Board of Great Britain makes its annual report for 1939. Finding the rock-dusted mines were not freed entirely from explosions, it has continued to ask why, and is finding a few of the answers. Troubled by spontaneous heating, it is using its gob-fire chamber to solve the problems of the detection and care of spontaneously fired goafs and gobs. Risks of shooting creviced coal is reduced by sheathing with a cooling shell, but not completely; so, foiled in finding anything better than Lemaire's sodium bicarbonate, the board is returning to a study of the explosive within the sheath. The war has made it necessary to study other means of roof support than timber or even steel and the Board is rendering that service. The practicalization of the Board—or should it be mechanicalization?—had brought it to a study of wheels, brakes on gradients and ropes; and of these experiments it has something to report.

Rock Dust—Its 1939 studies showed the importance of intimate mixture of rock dust with coal dust; others suggested that dolomitic limestone was more readily formed into a dust cloud when divested of its finest particles by a blast of air (elutriation). Grinding ¼ per cent of palmitic or stearic acid with limestone waterproofed that product and prevented caking. Results with gypsum and shale dusts were more difficult to obtain and less satisfactory. Limestone dust thus waterproofed, however, was not as efficacious in preventing an explosion as when not so waterproofed. Limestone dust freed of fines by blowing (elutriation) lost much of its efficacy, and the most efficacious of all three was the fine dust which the air freed from the original material.

Fire in Coal Cutting—Tests on the prevention of methane ignition during coal cutting appeared to show that for complete protection the air of the kerf must contain 21.5 per cent of carbon dioxide. However, quoting Imperial Chemical Industries and Anderson, Boyes & Co., which also have studied the matter, the Board announces that, with 1.5 cu.ft. of carbon dioxide per minute, the concentration of that gas at the end of the cutter bar ran from 5 to 10 per cent, so a quantity of dioxide that "might prove prohibitive" would be needed. With 25 per cent of dioxide, the ignition temperature of methane is raised only 40 deg. C.

Oil and Soap for Bits

As in America, the Board turns to water, declaring "the problem is somewhat similar to that of keeping a tool cool in turning" and adding that "probably it would be better to use a cooling liquid consisting of soap, oil and water than one of water alone. This would wet the coal better and be less likely to corrode cutter chains or picks."

Gob Fires—Using another kind of coal for its fire tests from that used in earlier experiments, gob-stink was not detected until more carbon monoxide was produced than had formerly been necessary. One cannot rely, therefore, on an absence of gob-stink as a guide in determining whether the gob is experiencing a threatening upswing in temperature. A carbonaceous clay that will not let the heat escape is blamed for heatings in four south Yorkshire coal fields. Ventilating pressures differing only 0.1 in. water gage around a sealed area gave a leakage of 400 cu.ft. per minute. The importance of balanced pressures in causing leaks into sealed fire areas is emphasized by the Board.

Where jute bags are filled with rock and used for stoppings, if they are dry, oxidation is slow and arises from chemical action; if damp, bacterial oxidation occurs, which is rapid. With unused bag material, maximum oxidation occurred in 30 to 50 hours and fell to half that speed after 96 hours, but still was about ten times as great as that of readily oxidizable coal exposed at the same temperatures for the same period. As bags decay and become weakened by bacterial oxidation until finally they may burst, they should be treated with some non-odorous antiseptic before being taken underground.

Keeping Step With Coal Demand

Bituminous Coal Stocks

Thousands

	Net Tons July 1 1941	P. C. Change From June 1 1941	P. C. Change From July 1 1940
Electric power utilities	9,988	+11.089	— 2.568
Byproduct coke ovens	5,913	+24.931	— 9.114
Steel and rolling mills	720	— 2.306	+33.087
Railroads (Class 1)	6,604	+ 7.644	+42.205
Other industrials*	14,024	+16.915	+11.028
Total	37,249	+14.320	+ 7.771

Bituminous Coal Consumption

Thousands

	Net Tons June 1941	P. C. Change From May 1941	P. C. Change From June 1940
Electric power utilities	5,124	+4.231	+33.472
Byproduct coke ovens	6,855	—0.232	+10.850
Steel and rolling mills	827	—1.194	+19.855
Railroads (Class 1)	7,576	—2.308	+22.213
Other industrials*	10,488	—3.068	+29.866
Total	30,870	—1.054	+23.539

* Includes beehive ovens, coal-gas retorts and cement mills.

Coal Production

Bituminous

Month of July, 1941, net tons.	43,300,000	
P.c. inc. over July, 1941.....		20.646
January-July, 1941, net tons..	268,702,000	
P.c. inc. over Jan.-July, 1940.		5.178

Anthracite

Month of July, 1941, net tons..	4,623,000	
P.c. inc. over July, 1940.....		1.963
January-July, 1941, net tons..	30,574,000	
P.c. inc. over Jan.-July, 1940..		1.034

Sales of Domestic Coal Stokers Vs. Oil Burners

Sales	Coal Stokers	Oil Burners
June, 1941.....	21,387	23,154
P.c. inc. over June, 1940	117.415	69.695
January-June, 1941.....	65,889	92,099
P.c. inc. over Jan.-June, 1940	80.148	40.753

Index of Business Activity *

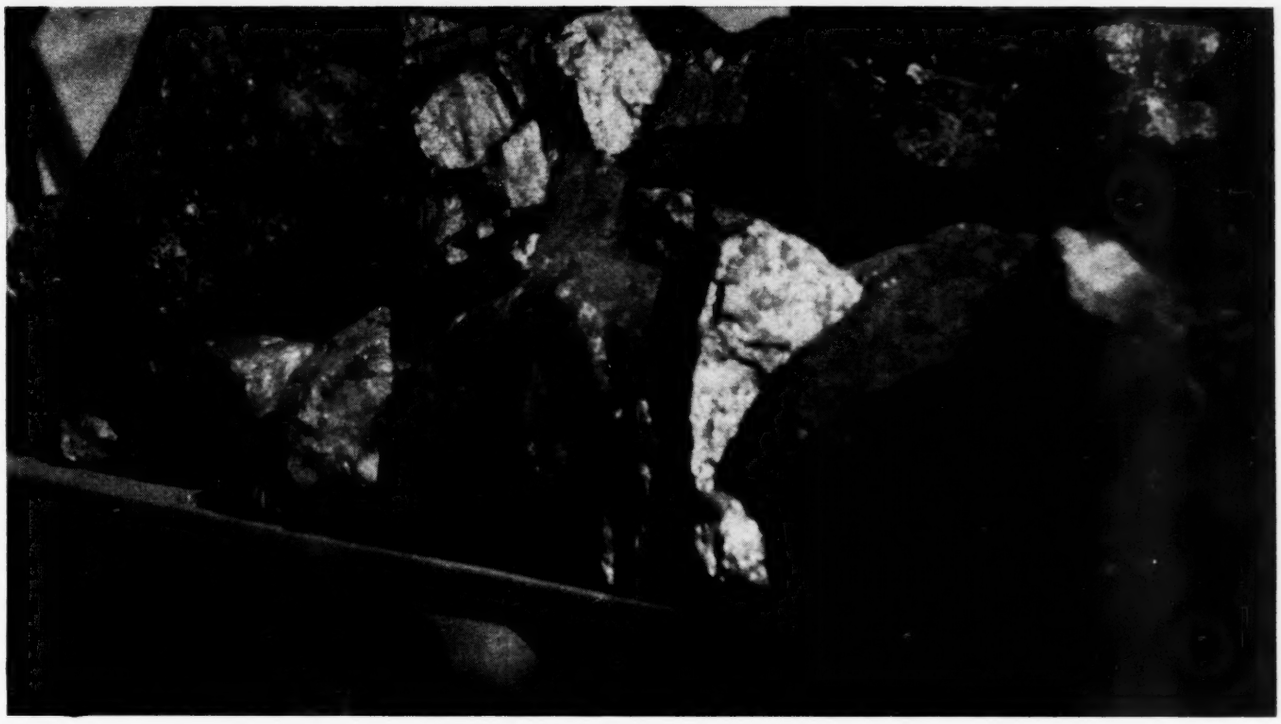
Latest week.....	158.1
Per cent change from month ago.	—0.031
Per cent change from year ago...	+24.783

* *Business Week*, Aug. 16.

Electrical Power Output †

Week ended Aug. 9, kw.-hr.	3,196,009,000
P.c. change from month ago	+1.751
P.c. change from year ago.	+16.5

† Edison Electric Institute.



A thousand pieces of string carrying coal

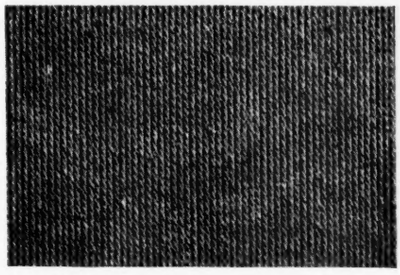
Why Goodrich cord belts, carrying lumps or in hard service, last longer than belts of woven fabric—shock resistance multiplied by 4

UNDER the rubber surface, an army of strings, from 1000 to 4000 side by side, pulling together in the same direction but never touching each other, extending for miles if necessary, make up the cord plies of B. F. Goodrich *cord* conveyor belts.

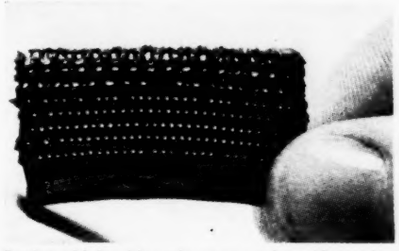
Each cord entirely surrounded by rubber. No cross strands of any kind. When a blow strikes the belt the cords can spread apart; the cord ply yields to the blow and cushions it in the same way as a pure rubber ply. Depth of cushion is approximately doubled; impact resistance multiplied by four because resistance to impact varies as the *square* of the cushion depth.

Other advantages, too

Plies of the Goodrich cord belts never separate because they're tied together by the rubber surrounding every cord. Flexing life is increased because there's no friction between crossing strands. Cord belts are practically stretchless because there is no crimp in the cords and because, in cord plies, the strands run only in the direction of the tension. We have never had one stretch as much as one-half of one per cent. They trough perfectly because of their crosswise flexibility.



Cord plies look like this. Every cord runs in the same direction with NO cross strands.



Section of belt with cords eaten out by acid—a piece of rubber with small tunnels through it—shows why plies can't separate.

Transverse cord breaker

Breaker fabric is cord too, running crosswise, not under tension. It distributes or spreads impact over wider areas, helps the belt cushion every hard, sharp blow.

Saves time, trouble, money

B. F. Goodrich cord belts save damage both from accidents or from normal hard usage, save time and trouble of belt repairs, save replacement costs because belts last so long. The more severe the service the greater the saving over ordinary belt construction.

Carried 7 times the tonnage

On an open-hearth limestone conveyor with difficult loading conditions the best fabric belt had carried 400,000 tons. Goodrich cord belt carried 2,784,000 tons. In another case belts had been lasting about two years, carrying a million tons. A Goodrich cord belt still looked good after 3 years and 1,500,000 tons. Let a B. F. Goodrich representative or distributor give you full details of these and many other records.

Used endless or with fasteners

Belts can be made endless at factory—or on the conveyors with portable electric vulcanizers, by operators trained by Goodrich—or can be used with fasteners under certain conditions.

Send for this booklet

Full engineering discussion of cord belts, principles of their construction, advantages, peculiarities, service conditions, etc., given in a 12-page booklet, which is free on request. Just ask your Goodrich distributor for it or write to The B. F. Goodrich Co., Mechanical Goods Division, Akron, Ohio.

B.F. Goodrich

First IN RUBBER

(Another story of Goodrich development work appears on page 1)

Sheathed Explosives—Sheathing is not equally effective with all explosives on the permitted list. Sheathed explosives were set in holes in two blocks of sandstone so that they bridged a gap between the blocks 4 in. wide, representing an unusually wide crevice. Six that gave a charge limit of over 6 oz. when freely suspended in firedamp did not ignite that mixture when they were fired while bridging the gap; two or three with a charge limit of 6 oz. ignited the firedamp and six with a charge limit under 6 oz. all set fire to the gas. By lowering the rate of detonation of one sheathed explosive from 3,715 to 2,040 meters per second, its charge limit, as based on the freely suspended cartridge, was raised from 2 to 10 oz. No better sheathing material than sodium bicarbonate has been discovered. Bicarbit, a German protective material, a mixture of nitroglycerine sodium bicarbonate and common salt, has been found less effective than sodium bicarbonate when tested by the suspended cartridge method.

To drill the larger holes required with sheathed explosives, the diameter of the drill is increased over the spiral for a length of only 6 in. from the cutting bit. This insures that "cartridges would follow the drill" and that the spiral would not create excessive friction on the sides of the shothole. Drilling speeds were not reduced, and the enlargement of the spiral enabled the latter to clear away cuttings. The shotholes also were straight. When the drill makers

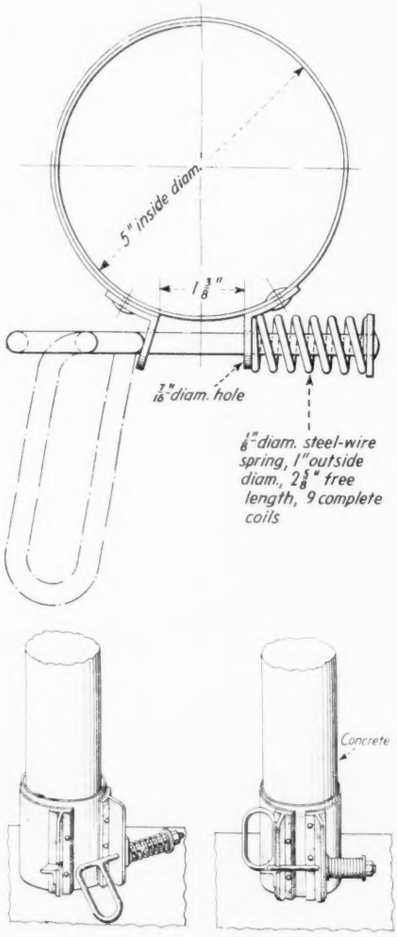


Fig. 1—Reference to some such arrangement as this is made by the Research Board.

Miner Completes 50 Years Without Injury

C. A. Lawson, of Beckley, W. V., retired Aug. 9 to settle down and enjoy the fruits of 50 years' toil in the mines. Representative Joe L. Smith, Mayor A. K. Minter of Beckley, and L. Ebersole Gaines, president of the New River Co., were among those present at a banquet marking Mr. Lawson's retirement.

For the last 22 years Mr. Lawson has been foreman at the Sprague mine of the New River Co., having joined the company eight years previous to his promotion. In the preceding 20 years he had worked for four other companies. In all of that time he never suffered an injury of any kind.

gained experience, drill breakages returned to normal.

Props—Props made of a good mixture of cement, sand and gravel with ends bound by steel bands or wire and with adequate reinforcement will withstand repeated setting and withdrawal and will not collapse violently in overloading. A plain steel tube of 8 in. diameter, 8 in. high, weighing 10 lb., placed on the floor and filled with machine cuttings on which the prop is set insures that, with normal convergence, the prop cannot be overloaded, permits a predetermined yield to accommodate roof subsidence and allows the prop to be withdrawn without damage. The tube can be used with wood props, but a steel disk between foot of prop and cuttings is helpful in preventing burring (see Fig. 1). For equal strength the area of a half-round section prop should be 12 per cent greater than that of a round section prop.

Packs—Outer walls of packs about 15 in. wide collapsed at 12 tons per foot run when compression was 20.5 per cent, but the resistance of inner walls of same width increased to 46 tons per foot run with a compression of 25 per cent. Resistance of both walls and filling increased more rapidly per unit of compression as total compression increased.

Wheels—By lengthening wheelbase or by increasing flange depth, cars are enabled by actual test to keep on the track at higher speeds. Freely running cars with loose wheels remain on the rails at a little higher speed than with fixed wheels. Rope-drawn cars leave the track much more readily than free-running cars, and whether they have loose or fixed wheels seems to make little difference.

Track Brakes—A car with specially lined brake shoes which grip the side of a third rail, which brakes are applied automatically by a governor when the car travels excessively fast, has given satisfactory results on a straight road on a gradient of 1 in 2 as tested by the research board.

Haulage Loads—A ⅝-in.-diameter ordinary lay rope developed compression of the core and wear between adjacent strands because it ran over rollers of small diameter on a turn and was coiled on a 33-in. drum. It should have been wound on a drum with a diameter 66 times that of the rope, or 42 in. Its deterioration was rapid even

STANDARD OIL COMPANY'S

IMPROVED COAL SPRAY OILS

These 4 qualities... give these advantages

AVAILABLE IN HEAVIER VISCOSITIES

RE NOT READILY ABSORBED

IVE A BLACK GLOSSY FINISH

AVE NO OBJECTIONABLE ODOR

Require less oil. It is not necessary to flood the coal with an excess of oil to get adequate coverage. Higher viscosity grades which are now available in Standard Oil Coal Spray Oils form a more lasting film.

Long-lasting protection. Special ingredients in these Coal Spray Oils form a tough film on the surface of the coal which prevents it from absorbing moisture or drying out—the principal cause of degradation and breakage.

Greater customer appeal. The oil-wetted surface of the coal has a black glossy finish. The small amount of oil required for dust protection does not run off onto the customer's floor.

No customer complaints. Because there is very little evaporation of the oil, no strong odors develop when the coal is in the customer's bin.

● Discuss your coal spray oil needs with a Standard Oil Engineer. He can help you pick the right grade of Standard Oil Coal Spray Oil for your type of coal and test it in your spraying equipment. Just call the local Standard Oil Company (Indiana) office or write 910 South Michigan Avenue, Chicago, Illinois, for the nearest Engineer.

STANDARD OIL COMPANY (INDIANA)

NG...LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRICA

though a dynamometer test showed the unusual kinetic factor of safety of 11.2.

Sir Edward Troup, failing in health, resigned as chairman of the Board, September, 1939, after 16 years of service, being succeeded by Sir Malcolm Delevingne, and Prof. R. V. Wheeler, director of research, died Oct. 28 of that year. The latter's position was filled by a governing committee, which will continue such researches as bear directly on the health and safety of the miner and promise early results. Researches for war work also will be made.

Price of the book is 30c., obtainable from British Library of Information, New York.

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Britain Compiles Revision Of Its Coal Mines Act

Since the passing of the Coal Mines Act of 1911, Great Britain has added several amendments by legislation and by order. The Mines Department has just published the 1940 edition of the law revised to Dec. 31, 1940, and entitled Coal Mines Act, 1911, Regulations and Orders Relating to Safety and Health, 195 pp.; price, postpaid, British Library of Information, New York, 60c. This book also lists approved safety lamps, flame lamp glasses, Pyrophor relighter bars, lamp bulbs, electric lighting apparatus, permitted explosives and shotfiring apparatus.

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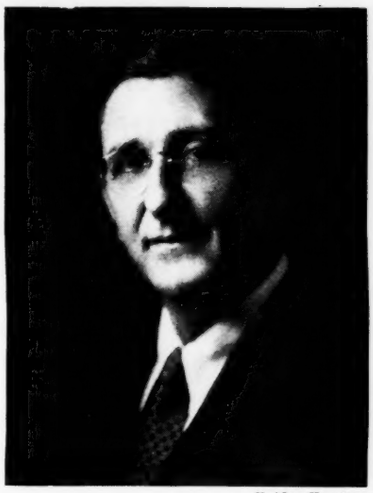
Windsor Coal Co. to Open New Strip Operation

Windsor Coal Co., having worked out the strippable tonnage in its mine near Windsor, Mo., which it developed in 1930, is now moving its preparation plant to and installing a new 15-yd. Marion electric-driven shovel at New Castle station, about 80 miles east of Kansas City, Mo., and 10 miles east of Windsor, on the Kansas City-St. Louis line of the C.R.I. & P.R.R. The company has leased between 2,000 and 3,000 acres of coal in the New Castle area, and the new operation will have a capacity of about 1,000 tons per day of mine-run coal.

Prior to January of this year the controlling stock of the Windsor Coal Co. was owned by Joe Klaner, and, subsequently, by his estate; while the remainder of the stock was owned by the McAlester Fuel Co., through the Kansas City office of which the total output of Windsor coal has been sold. In January, however, the McAlester Fuel Co. acquired from the Klaner estate a substantial block of its stock, thereby obtaining control of operation as well as sales. J. G. Puterbaugh, president of the McAlester Fuel Co., McAlester, Okla., is now president of the Windsor company, and F. M. Eviston, vice president and sales manager of McAlester Fuel Co., Kansas City, Mo., is now also vice president of the operating company.

In addition to the new 15-yd. Marion shovel, which will be equipped with all the latest devices, including knee-action front end, the company expects to operate in the new area its 300 Marion electric 8-yd. shovel and its 325 Bucyrus steam shovel. The McNally-Pittsburg Mfg. Corporation is constructing a second Norton washery unit which will give the company sufficient capacity to wash its total output of coal.



Kaiden-Keystone

Gerald B. Gould, president, Fuel Engineering Co., New York, named as advisory consultant on coal prices in the Fuel Section, Office of Price Administration and Civilian Supply.

1,820-Mile Pipe Line Planned To Cut Oil Shortage

A plan for the construction of a pipe-line system to carry 250,000 bbl. of crude oil daily 1,820 miles to the New York and Philadelphia areas to overcome the impending oil shortage has been submitted by eleven of the largest American oil companies, according to an announcement by Harold L. Ickes, Defense Petroleum Coordinator, on Aug. 11. The plan calls for the formation of an $80,000,000 company, National Defense Pipelines, Inc., to start work immediately on the new system and complete it within nine months. A second company, Emergency Pipelines, Inc., will be set up to build a small connecting link with the larger system; the larger company, however, will construct all but 65 miles of the pipe lines and all the pumping facilities.

National Defense Pipelines is to build and operate a 22-in. line from Shreveport, La., to Salem, Ill., 490 miles away; a 16-in. connecting line from Salem to Wood River, Ill., 65 miles distant, to tap existing facilities carrying oil from Oklahoma, Kansas, Texas, Mid-continent and Illinois fields, and a 24-in. line from the junction of the first two lines near Salem to refining centers, 1,200 miles east in the New York and Philadelphia areas. Emergency Pipelines would build and operate only a 22-in. line from the east Texas oil fields to Shreveport to connect with the line to be built by National.

The companies participating in the project are: Standard Oil Co. of New Jersey, Atlantic Refining Co., Cities Service Co., Socony-Vacuum Oil Co., Inc.; Tide Water Associated Oil Co., Texas Corporation, Shell Oil Co., Inc.; Gulf Oil Corporation, and Pan-American Petroleum & Transport Co. The proposed agreement provides that other companies wishing to participate in the construction and use of the network may do so within three months after formal execution of the agreement, subject to the same provisions as the original companies.

The companies which prepared the plan, said Mr. Ickes, had already laid much of the

Garfield G. Bowser, president, Mining Society of Nova Scotia, 1941-42, elected June 24.

groundwork, so that construction might get under way as soon as possible. Survey parties were in the field, he added, with aerial photographing of the route in progress and likely to be finished soon, assuring maximum progress once it was possible to begin actual construction.

It will be necessary for President Roosevelt to issue a proclamation declaring the proposed lines necessary for national defense before work can begin, said Mr. Ickes. The proclamation would set forth the terms under which the corporations would construct the lines, and enable them, if necessary, to take over property under the right of eminent domain, as authorized in the pipe-line act.

National Defense Pipelines, Inc., would finance itself without cost to the Federal Government, by borrowing privately 80 per cent of the estimated cost of the lines and facilities to be constructed by it. The balance would be made up through issuance of junior securities or capital stock, which would be purchased by the eleven participating companies on a percentage basis. Emergency Pipelines would be financed in a similar manner.

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Zenith Acquires Briggs Co.

Faries mine of the Briggs Coal Co., situated two miles south of Oakland City, Ind., was purchased early in July by J. J. Katz, operating as the Zenith Coal Co. The mine produces about 125 tons daily.

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Reopen Pittsburgh Co. Mines

Banning No. 2 mine of the Pittsburgh Coal Co., Whitsett, Pa., resumed operating on Aug. 18. Served by the Pittsburgh & Lake Erie R.R., the mine is producing 1,000 tons per day, which is screened and loaded on four tracks.

Mongah mine, Monongahela, Pa., is scheduled to reopen on Oct. 1. Also served by the P. & L. E., this mine will have a daily output of 1,200 tons.

Consulting Group Named On Mine Inspection

Appointees to a six-member committee, to consult in administration of the Federal Coal Mine Inspection Act, were announced Aug. 23 by the U. S. Bureau of Mines. The members, three representing operators and three the mine workers, are:

Cadwallader Evans Jr., vice president and general manager, Hudson Coal Co.; L. C. Campbell, general manager, Koppers Coal Co.; T. J. Thomas, president, Valier Coal Co.; Percy Tetlow, industrial representative, United Mine Workers; John T. Jones, president, District 16, U.M.W., and Thomas Kennedy, international secretary-treasurer, U.M.W.

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Harlan Observes Anniversary Of Inception of Mining

Harlan Mining Institute, Harlan, Ky., put on an all-day celebration on Aug. 23 of the opening of the Harlan coal fields, in 1911, when the first carload of Harlan coal was shipped from the county on Aug. 25. In connection with the celebration, the first Harlan "coal queen" was crowned in front of the public drinking fountain, built of coal and dedicated by the institute as part of the celebration. A parade of bands from the county's nine high schools preceded the dedication.

Thirty first-aid teams from mines in Harlan, Knox and Bell counties, Kentucky, and Lee County, Virginia, participated in demonstrations at Georgetown Park, and cash prizes were awarded to the winners.

The program was staged by a committee headed by James F. Bryson, safety director, Harlan County Coal Operators' Association, who also is secretary of the institute. Among officials of the celebration program were George S. McCaa, inspector, Pennsylvania State Department of Mines; G. Moss Patterson, chief, Kentucky Department of Mines and Minerals; J. J. Forbes, U. S. Bureau of Mines, Pittsburgh; P. C. Emrath, College of Mine Engineering, University of Kentucky, and J. B. Allen, secretary, Kentucky River Mining Institute.

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To Develop Illinois Coal Tract

F. C. Morgan Coal Co. has acquired about 1,000 acres of land which it proposes to develop for mining purposes, with a tipple to be located about 2 miles west of Bryant, in Fulton County, Illinois. The Chicago, Bur-

Bureau of Mines Approvals

Three approvals of permissible equipment were issued by the U. S. Bureau of Mines in July, as follows:

Jeffrey Mfg. Co.—Type 61-L face conveyor; 5-hp. motor, 230 volts, d.c.; Approval 433; July 17.

Brown-Fayro Co. — Model BC "Brownie" blower; 1½-hp. motor, 230 and 550 volts, d.c.; approvals 434 and 434A; July 29.

Mine Safety Appliances Co.—M. S. A. methane tester (Edison storage-battery type); Approval 808; July 23.

lington & Quincy R.R. and the coal company have been authorized by the State Commerce Commission to extend a mine track at grade across State Highway 100 and a north-and-south township highway near the center of Sec. 36 of Pullman Township.

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Personal Notes

A. P. BOXLEY has been appointed general superintendent of the Koppers Coal Co. with headquarters at Kopperston, W. Va.

RICHARD B. ENGDAHL has joined the research staff of Battelle Memorial Institute, Columbus, Ohio. He has been assigned to the division of fuels research and will assist in an investigation of the use of pulverized fuel for the firing of ceramic and metallurgical furnaces. He is a graduate of Bucknell University and the University of Illinois. He was research assistant and member of the faculty at the latter school previous to joining the Battelle staff.

A. FAUL has been appointed mine foreman at Campbells Creek mine of the Koppers Coal Co., Kopperston, W. Va. He was transferred from the Sonman mine, Sonman, Pa.

W. C. HALBERT has been named superintendent at the Happy Collieries, Inc., Warren, Ky., vice JOHN LEE, resigned. Prior to his new connection, Mr. Halbert was personnel manager for the Consolidation Coal Co., Kentucky division, and assistant mine foreman for the Kentucky Jellico Coal Co., Kay Jay, Ky.

THOMAS O'HARA has resigned as a district mine inspector in West Virginia to accept the post of assistant superintendent of the Osage mine of the Christopher Coal Co., Osage, W. Va. He was mine foreman at Everettville for ten years when he became Sheriff of Monongalia County.

ARTHUR PENNINGTON has been made mine foreman at the Carswell mine of the Koppers Coal Co., Kimball, W. Va.

W. POTTER has been appointed general night foreman at the Kopperston mine of the Koppers Coal Co., Kopperston, W. Va.

JOHN WELLS, mine foreman at the Wharton mine of the Koppers Coal Co., Wharton, W. Va., has been transferred to the Kopperston mine as mine foreman.

Adam L. Wesner

Dr. Curtis L. Wilson

ADAM L. WESNER has joined the technical staff of Battelle Memorial Institute, Columbus, Ohio. He has been assigned to the division of materials beneficiation where investigations of coal laundering and ore-dressing methods are in progress. Prior to joining Battelle, he was associated with the U. S. Bureau of Mines at Rolla, Mo. He is a graduate of Case School of Applied Science.

DR. CURTIS L. WILSON, for the last 20 years connected with the Montana School of Mines at Butte, and for the last 13 years professor of metallurgy and head of the metallurgy department there, has been appointed dean of the Missouri School of Mines and Metallurgy, at Rolla, succeeding DR. WILLIAM R. CHEDSEY, who resigned. Dean Wilson assumed his new duties on Aug. 1. Born and reared in Baltimore, Md., Dean Wilson was graduated from the Baltimore City College in 1916, after which he moved to Montana and was graduated from the Montana School of Mines in 1920. After working for a year with the Anaconda Copper Co. at Butte in various capacities Dr. Wilson joined the faculty of the Montana School of Mines as instructor and was later promoted to the head of the metallurgy department.

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Security Bureau Fights Awards To Idle Colorado Miners

In an effort to have set aside a ruling of the State Industrial Commission of Colorado that miners employed by the Hayden Coal Co. were entitled to unemployment compensation while the company's mine in Routt County was closed last spring, the State Department of Employment Security filed a suit Aug. 4 in the Denver District Court.

The complaint alleged that the finding of the commission that the cessation of work was not due to a strike was contrary to the evidence. A majority of the commission took the position that the suspension of work was to enable the company to deepen a shaft.

Repair Parts Accorded Blanket A-10 Priority; Emergency Orders May Take Top Rating

REPAIR and maintenance parts and materials necessary for the continued operation of nine groups of essential industries, including coal mining, have been given a blanket A-10 priority rating by OPM. Emergency requirements, where OPM so elects, may take an A-1-a status. Announcement of this plan, implementing the order issued by OPACS on June 30 (*Coal Age*, August, 1941, p. 86), was made by the OPM Priorities Division on Aug. 8.

This new order apparently has no relation to the order issued on July 29 establishing an A-3 rating on materials used in the construction of complete machines. The July 29 order, noted briefly in the preceding issue, was promulgated on OPM's initiative without any previous public suggestion for such action by OPACS. Earlier A-3 orders on locomotives and railroad, industrial and mine freight cars followed rulings of OPACS. The order on mining equipment was promulgated after strong representations made in Washington by manufacturers and the mining associations.

Defense Products Covered

The July 29 order applies to the following mining machinery and equipment, which are defined in the order as "defense products":

1. Machinery and equipment directly necessary for underground and open-cut production of (a) coal, and (b) any materials produced with a view to extracting their metallic content; and
2. Machinery and equipment for all customary processes necessary for beneficiation and preparation for shipment of the coal and other materials specified.

The preference rating accorded covers material—defined as "any commodity, equipment, accessories, parts, assemblies or products of any kind"—which will enter directly or indirectly, at any stage, into the production of the machinery and equipment named.

Application of the preference rating is limited to deliveries of material included under the Priorities Critical List as amended from time to time. The current revised edition of that list covers approximately 300 items and classes of items. The benefit of the preference rating also may be extended to organizations or individuals who have contracts or purchase orders to supply the manufacturer with material entering into the production of the equipment and machinery. It does not, however, apply to deliveries to such suppliers of machinery or equipment used in the manufacturing process by the supplier.

The text of the OPM order on maintenance and repair parts, entitled "Notice Concerning Maintenance and Repairs Rating Plan," reads as follows:

The Office of Price Administration and Civilian Supply issued on June 30, 1941 (6 Federal Register 3215), a Civilian Allocation Program for Materials and Equipment used in Maintenance and Repair Work, specifying the industries and services to be covered by the Program, and providing for a priority status for materials and equipment required to maintain them in satisfactory operating condition.

The Program specifies that it is to be administered and enforced by the Office of Production Management.

The Division of Priorities of the Office of Production Management has accordingly formulated a plan known as the "Maintenance and Repairs Rating Plan" to provide preference ratings for maintenance and repairs in the industries and services specified in the Program and in certain additional industries and services, the continued effective operation of all of which it has determined is essential to defense, as well as to civilian life.

The list set forth below includes only those industries and services mentioned in the Program to which the Plan is made available immediately. The other industries included in the June 30 list as well as others deemed essential to the Program will have the Plan made available to them as rapidly as administrative facilities will permit.

Each of these industries and services not only serves civilian requirements but also promotes defense. However, it is impossible to determine the particular part of any unit of such industry or the particular units of such an industry which promote defense, as distinguished from the parts or units which serve only civilian life. Therefore no such division is made, and all of them are listed under the Plan in their entirety as promoting defense and, accordingly, entitled to a defense rating.

A preference rating of A-10 will be assigned to the following industries and services, after the approval of their applications, but other ratings, either higher or lower, may be assigned in any case, from time to time hereafter:

1. Commercial air lines maintaining regular scheduled service.
2. Explosives—plants engaged principally in manufacturing explosives.
3. Metallurgical plants engaged in the production of metals and alloys.
4. Mines—including are dressing or processing plants and smelting facilities.
5. Federal, State, county and municipal services: Protective services (fire and police). Utilities—electrical energy (production and distribution), gas production and distribution (manufactured and natural), water production and distribution, sewer service. Common carrier passenger transportation by urban, suburban, and interurban electric railways; also by urban and suburban motor and electric coach.
6. Public utilities (privately owned)—electrical energy (production and distribution), gas production and distribution (manufactured and natural), water production and distribution, and sewer service.
7. Railroads.
8. Coke converters.
9. Common carrier passenger transportation by urban, suburban and interurban electric railways; also by urban and suburban motor and electric coach (privately owned).

How to Qualify—Any person (which term includes any individual, firm, corporation, or other form of enterprise) engaged in one of the above described activities who finds that he is unable to provide for his maintenance and repairs without the assistance of the Plan may secure an application Form PD-67, applying for a Maintenance and Repairs Preference Rating Order to be issued to the applicant, by writing to the Director of Priorities, Attention: Maintenance and Repairs Section, 462 Indiana Avenue, Washington, D. C. If the Division of Priorities, after considering the application believes that in the interest of National Defense the Plan should be made applicable, it will issue an Order, assigning to the applicant a preference rating for his maintenance and repairs.

Rating to be Granted—The rating assigned by such Order to any applicant who is wholly or substantially engaged in one of the activities specified in the foregoing list will be A-10, for use only in securing maintenance and repair requirements. If a higher rating has been assigned to a delivery of material for such maintenance and repairs by any other Order or by an individual Preference Rating Certificate, it may, of course, be used instead of such A-10 rating.

Definitions—An applicant to whom an

PD-67

MAINTENANCE AND REPAIRS SECTION
DIVISION OF PRIORITIES
462 INDIANA AVENUE NW.
WASHINGTON, D. C.

APPLICATION FOR MAINTENANCE AND REPAIRS RATING ORDER

Date .....

1. .....
(Legal name of applicant)

.....
(Address)

.....

hereby request issuance of a Maintenance and Repairs Rating Order.

2. Industry (as listed in "Maintenance and Repairs Rating Plan") .....

.....

3. Products Manufactured, or Services Rendered to Public which qualify applicant under Maintenance and Repairs Plan .....

.....

.....

.....

.....
(Legal name of applicant)

By .....
(Authorized official)

U. S. GOVERNMENT PRINTING OFFICE 16—22756

Mines seeking an A-10 rating for maintenance and repair parts must make application on this form. (original size 8x10¼ in.)

Order has been issued will be termed a "Producer."

"Material," as used in the Plan, means materials, equipment, accessories, parts, assemblies, products and commodities of every kind.

"Maintenance" means the upkeep of a Producer's property and equipment.

"Repair" means the restoration of a Producer's property and equipment to a sound condition after wear and tear, damage, destruction of parts, or the like.

The terms "Maintenance" and "Repair" do not include the improvement of a Producer's property or equipment by replacing material which is still usable with material of a better kind, quality, or design.

How to Use the Order—A Maintenance and Repairs Preference Rating Order granted by the Division of Priorities to a Producer will not be effective until the latter has executed his acceptance upon a copy of the Order in the space provided at the end thereof and has returned such copy to the Division of Priorities. Thereafter, the Producer will execute his acceptance upon one additional copy of the Order for each supplier (vendor) against whose deliveries to the Producer the rating is to be applied, and will deliver the additional copy to such supplier.

The Order issued to a Producer will bear a serial number. After a copy of the Order has been served upon a supplier by the Producer, the Producer will indicate the serial number on each purchase order which the Producer subsequently gives to the supplier and by so doing will make the preference rating assigned applicable to each such purchase order. The supplier will give effect to the rating by scheduling his deliveries so that the material ordered by the Producer will have priority over other material to the delivery of which a lower preference rating or no preference rating has been assigned.

A Producer qualified under the Order will be required to maintain accurate records of all applications of preference ratings to deliveries of material for maintenance and repairs under the Order so that they may be readily examined by a Field Inspector of the Division of Priorities. Producers using the Order will be required to file from time to time such reports as the Director of Priorities may prescribe.

Any falsification in such records or reports, or in any application under the Plan, may be subject to appropriate action by the Director of Priorities, including a recommendation for prosecution under Section 35 of the Criminal Code (18 U. S. C. 80).

As explained in the Order, the rating may be used not only by the Producer for his maintenance and repair requirements, but also by his suppliers in turn for their materials to enable them to fulfill the Producer's purchase orders.

A Producer whose maintenance and repair work is done by a contractor and not by the Producer himself, may likewise extend the use of the rating to such contractor so that the latter may apply the preference rating to deliveries of material to him which he requires in order to perform his maintenance and repair contract with the Producer.

Emergency Rating—In addition to the A-10 rating, any producer in an industry or service listed above may apply by telegram to the Director of Priorities, Attention: Maintenance and Repairs Section, 462 Indiana Avenue, Washington, D. C., for the granting to him of an A-1-a rating for emergency repairs.

The term "emergency" means a situation arising out of fire, flood, explosion, wreck, hurricane, lightning, or major breakdown, which requires immediate action in order to prevent a serious interruption in the functioning, or a serious lessening in the efficiency, of a Producer's property or equipment or an important part thereof.

The telegram must state:

(a) Date the emergency arose—nature and cause of emergency.
(b) Property or equipment to be repaired and its operating importance.
(c) Material required for the emergency repair and the quantity required.
(d) The supply of such material which the applicant has on hand.
(e) Names and addresses of suppliers from whom the emergency repair material is to be obtained.

The telegraphic application for emergency rating will be immediately reviewed and the applicant promptly notified of the permissibility of applying an A-1-a rating to all the suppliers of materials required for the emergency repair.

Rating Cannot Be Used to Obtain Excess Inventory—A Producer will be prohibited from applying the preference ratings under the Order to increase his inventory of material in excess of the amount necessary to maintain and repair his property and equipment on a basis which is necessary to his rate of operation.

General—It is not intended that the application of the Maintenance and Repairs Rating Plan will supersede or interfere with the operation of any General Preference Orders or other General Orders affecting material issued by the Division of Priorities.

It is believed that the proper use of this Plan should enable a Producer to keep his property and equipment in a sound condition and should prevent interruptions and losses in efficiency which would interfere seriously with the Defense Program.

All inquiries concerning the Plan should be addressed to the Director of Priorities, Attention: Maintenance and Repairs Section, 462 Indiana Avenue, Washington, D. C.

Under the A-3 ratings given to manufacturers of mining machinery and to car and locomotive builders, the priority authorization is issued to the manufacturer or builder. In the maintenance and repairs set-up, however, the preference rating is issued to the buyer. This means, of course, that every mining company which feels the need for government aid in expediting the delivery of essential repair and maintenance parts and materials must make individual application for the priority rating to the OPM Maintenance and Repairs Section.

At the time the A-3 order on mining machinery and equipment was promulgated, OPM announced that the order had been sent to about 40 manufacturers. The companies included in this list are:

Allis-Chalmers Manufacturing Co., Brown-Fayro Co., Bucyrus-Erie Co., Chain Belt Co., Chicago Pneumatic Tool Co., Cleveland Rock Drill Co., Colorado Iron Works, Deister Concentrator Co., Deister Machine Co., Denver Equipment Co., Dorr Co., Eimco Corporation, Gardner-Denver Co., Goodman Manufacturing Co., Hardinge Co., Independent Pneumatic Tool Co., Ingersoll-Rand Co., Jeffrey Manufacturing Co., Joy Manufacturing Co., La-Del Conveyor & Supply Co., Link-Belt Co., McNally Pittsburg Manufacturing Co., Marion Steam Shovel Co., Mine & Smelter Supply Co., Mine Safety Appliances Co., Morrow Manufacturing Co., Myers-Whaley Co., Nordberg Manufacturing Co., Ohio Brass Co., Oliver United Filters Co., Roberts & Schaefer Co., Stephens-Adamson Manufacturing Co., Sullivan Machinery Co., Traylor Engineering & Manufacturing Co., Vulcan Iron Works (Denver, Colo.), Vulcan Iron Works (Wilkes-Barre, Pa.), Western Machinery Co., Worthington Pump & Machinery Corporation, and Yuba Manufacturing Co.

Applications from a number of other manufacturers for the extension of the A-3 rating to their activities are under consideration by OPM officials.

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Utah Plant Will Burn Coal

Utah Copper Co. is constructing an electric generating plant at Garfield, near Salt Lake City, to cost in excess of $5,000,000 and to consume 250,000 tons of coal a year. According to D. D. Moffat, vice president and general manager of the company, the plant will be put into operation in 1943. Designs for the structure are already under way and an announcement of the date for starting construction is to be made soon. The generators will be located adjacent to the company's concentrating mills at Garfield, and present plans call for an installed capacity of 75,000 kw.

First Editor of Coal Age, F. W. Parsons, Dies

First editor-in-chief of *Coal Age* and later vice-president and editorial director of the Robbins Publishing Co., Floyd William Parsons died of an embolism, Aug. 7, at the Post-Graduate Hospital, New York, some time after an operation, from which he seemed to be making an excellent recovery. He had reached the age of 61. Born in Keyser, W. Va., the son of Marshall J. and Mary C. Long Parsons, he studied mining engineering at the University of West Virginia and later attended Lehigh University, where he received his degree as Engineer of Mines in 1902.

Subsequently he became chief engineer of the Stonewall Coal & Coke Co., of West Virginia; still later district engineer, Lehigh

Pach Bros.

Floyd W. Parsons

Valley Coal Co., at Wilkes-Barre, Pa., then resident engineer, Consolidation Coal Co., Frostburg, Md., and later chief engineer of the New River Consolidated Coal & Coke Co., Rush Run, W. Va.

After a short experience as assistant professor of mining, Michigan College of Mines, Houghton, Mich., 1905-1906, he became chief engineer, Victor Fuel Co., later to be known as the Victor-American Fuel Co., and the Colorado & Southwestern Railway Co., Denver, Colo. Shortly before May 5, 1906, he became associate editor of the *Engineering and Mining Journal*. When John A. Hill, president, decided in 1911 to found *Coal Age*, devoted solely to coal mining, F. W. Parsons was made editor-in-chief of that periodical, which made its bow to the public, Oct. 14, 1911. He continued as editor until 1919, a period including the World War. It may now perhaps be stated without umbrage that the celebrated Peabody committee was named by Mr. Parsons, though of course not appointed by him. As a member of a party of journalists he was invited by the British Government to visit England in 1918. He was appointed assistant to Harry A. Garfield, U. S. Fuel Administrator.

One outstanding development in the coal industry, the Rocky Mountain Coal Mining Institute, which first met Nov. 30, 1912, owed its existence to the activity of Mr.

Parsons, and of that society he remained an honorary member until his death.

Meantime, he had written articles relative to the mining industry and the War for the *Saturday Evening Post* and he resigned from the editorship of *Coal Age* to write for the former magazine other articles regarding a wide range of subjects under the title "Everybody's Business." His valedictory in *Coal Age*, "A Parting Word," appeared May 29, 1919. He contributed regularly to *World's Work* from 1918 to 1922. "American Business Methods," in 1921, and "Everybody's Business," in 1923, brought together much of Mr. Parsons' work. For the last 20 years he has been associated with the Robbins Publishing Co., publisher of trade and business periodicals, his first work in *Gas Age* appearing Oct. 22, 1921. At his death, he was a member of the board of directors of that company, editor of *Gas Age* and *Industrial Gas*, and contributing editor to *Advertising and Selling*.

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Scholarship Winners Chosen

Lehigh Navigation Coal Co., Inc., scholarship committee announces selection of scholarship winners this year: Robert Gildea, Coaldale, Pa., a graduate of St. Mary's High School, Coaldale, class of 1940; one of the years of his scholastic career was spent at St. Paul's Academy, Washington, D. C. Harry Kemery, Tamaqua, Pa., a graduate of Tamaqua High School, class of 1940, and who also completed the first year of Mining Night School conducted at Coaldale during the last year.

This is the second year of the company's scholarship program, which is intended to supply technically trained men for various departments such as mining, preparation and research.

Last year's scholarship winners, David Crawford and Edward Kleckner, have completed their first year in mining engineering at Penn State and have made excellent records. Both are now employed by the Lehigh Navigation company for the summer in the engineering corps.

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Butler Consolidated Reorganized

Reorganization of the Butler Consolidated Coal Co., Wildwood, Pa., having been approved by the Butler County Court, the receivership terminated on July 31. Retaining its old name, the company started business on Aug. 1 with the following officers: Marten A. Reiber, president; F. G. West, vice president and general manager, and C. A. Wilder, secretary-treasurer.

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Obituary

RICHMOND P. WETMORE, 46, chief mining engineer, Woodward Iron Co., Woodward, Ala., died Aug. 8 in a Birmingham hospital after a brief illness. He had been connected with the company since returning from the World War.

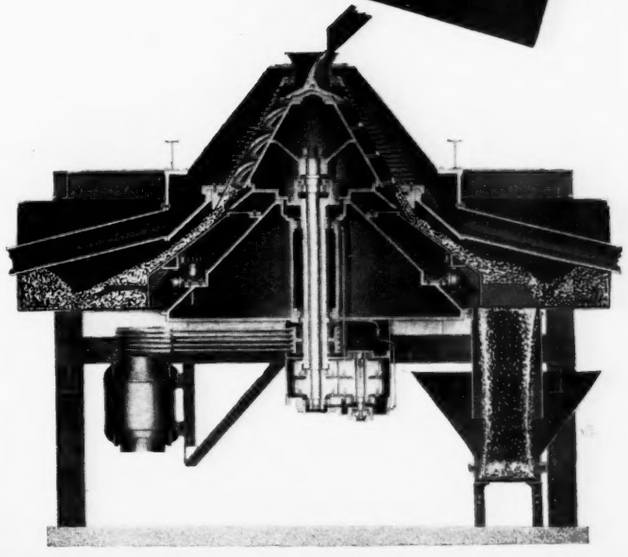
E. C. PATTERSON, 45, foreman at the Hickory mine of the K & S Coal Co., Prairie View, Ark., died Aug. 11 when he touched a charged electric wire.

One modern replacement of great importance is the · · ·

"C-M-I" Continuous Centrifugal DRYER

For securing uniform dry coal in all sizes below ½ inch. The modern design, dependable performance, low operating cost of this dryer, all of which have been proved in service, will help modernize your plant. Also, many slurry coals may be reclaimed and used for special purposes, or mixed with larger sizes, by the use of this machine.

A new bulletin gives you these facts. Send for your copy.



CENTRIFUGAL AND MECHANICAL INDUSTRIES, INC.

SECOND AND PRESIDENT STREETS — ST. LOUIS, MO.

Stove Makers Support Research To Improve Coal Heating

Leading manufacturers of stoves—26 of them—have joined with Bituminous Coal Research, Inc., in sponsoring an enlarged research program to develop improved coal-fired heaters and kitchen ranges, it was announced Aug. 16 by Battelle Memorial Institute, Columbus, Ohio, where the research is already in progress. The three-year program extends and enlarges the program on stoves started in November, 1940, for the coal industry. Arrangements for the joint effort were made by Bituminous Coal Research, Inc., with the cooperation of the Solid Fuel Division, Institute of Cooking and Heating Appliance Manufacturers.

Objectives of the research program are stoves for use with bituminous coal that will burn both high- and low-volatile coals without smoke, that will automatically regulate the rate of burning, and that will have fuel capacity for 12 to 24 hours of operation at rated output.

Bolling Jones, Jr., president, Atlanta Stove Works, is chairman of the committee which represented the stove manufacturers in arranging the program. Serving with him were B. B. Turner, sales manager, Globe American Corporation; King Ehret, Oakland Foundry Co., and Sam Dunckel, managing director, Institute of Cooking and Heating Appliance Manufacturers. The following stove manufacturers are participating in the research program: Agricola Furnace Co., A & J Mfg. Co., Allen Mfg. Co., American Stove Co., Andes Range & Furnace Corporation, Athens Stove Co., Atlanta Stove Works, Cole Hot Blast Mfg. Co., Cameron Stove Mfg. Corporation, Estate Stove Co., Floyd-Wells Co., Glenwood Range Co., Globe American Corporation, Hardwick Stove Co., Indianapolis Stove Co., Kalamazoo Stove & Furnace Co., King Stove & Range Co., Majestic Mfg. Co., Marshall Stove Co., Moore Corporation, Oakland Foundry Co., Ohio Stove Co., Renown Stove Co., Rife-Loth Corporation, Round Oak Co., and Tennessee Stove Works.

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New Preparation Facilities

Avis-Eagle Coal Co., Lyburn, W. Va.—Contract closed with Kanawha Mfg. Co. for rotary dump, combination apron feeder and bin filling boom, reciprocating feeder and downhill conveyor to handle mine-run; capacity, 200 tons per hour.

Ayrshire Patoka Collieries Corporation, Clinton, Ind.—Contract closed with Templeton-Matthews Corporation to design and supervise new tipple to have an ultimate capacity of 450 t.p.h., loading on four tracks; provision will be made for future addition of a washing plant; replaces burned structure.

Borderland Collieries Co., Borderland, W. Va.—Contract closed with Jeffrey Mfg. Co. for single-compartment diaphragm jig; capacity, 75 t.p.h. raw-coal feed.

Cranberry Improvement Co., Hazelton, Pa.—Contract closed with Wilmot Engineering Co. for new steam preparation plant; equipment to consist of three 7-ft. Hydrotators and one 16-ft. classifier to prepare rice, barley, No. 4 and No. 5 sizes of anthracite; also for changes in existing plant.

Crystal Block Coal & Coke Co., Mine No. 1, Rawl, W. Va.—Contract closed with

Kanawha Mfg. Co. for miscellaneous conveying equipment for use in connection with Kanawha-Belknap washer.

DE BARDELEBEN COAL CORPORATION, Sumiton, Ala.—Contract closed with Deister Concentrator Co. for one "SuperDuty Diagonal-Deck" No. 7 coal-washing table to treat 0x¼-in.

DONALDSON COAL CO., Good Springs, Pa.—Contract closed with Deister Concentrator Co. for four "SuperDuty Diagonal-Deck" No. 7 coal-washing tables to treat buckwheat, rice, barley and No. 4 buckwheat.

ELMIRA COAL CO., Elmira, Mo.—Contract closed with Deister Concentrator Co. for one 3x6 ft. double-surface motor-driven Leahy screen to prepare stoker coal.

GILBERTON COAL CO., Gilberton, Pa.—Contract closed with Wilmot Engineering Co. for 12-ft. classifier with high-speed dewatering screen to prepare No. 5 anthracite.

GULF, MOBILE & OHIO RAILROAD CO., Sparta, Ill.—Contract closed with McNally-Pittsburg Mfg. Corporation for McNally-Norton unit-type washery to clean 0x3-in. coal at rate of 60 t.p.h., together with tipple and crushing equipment to produce 0x5-in. railroad coal; to be completed about Dec. 1.

LOCUST COAL CO., Shenandoah, Pa.—Contract closed with Deister Concentrator Co. for one "SuperDuty Diagonal-Deck" No. 7 coal-washing table to handle No. 4 buckwheat.

NORTH LINE COAL CO., Shamokin, Pa.—Contract closed with Wilmot Engineering Co. for installation of three Type D jigs to prepare stove, nut and pea sizes of anthracite.

PARAMOUNT COAL CO., Archbald, Pa.—Contract closed with Finch Mfg. Co. for one 3-ft. Menzies cone separator to clean buckwheat, rice and barley; feed capacity, 12 tons per hour.

SCHUYLER COAL CORPORATION, Rushville, Ill.—Contract closed with Deister Concentrator Co. for four "SuperDuty Diagonal-Deck" No. 7 coal-washing tables and one 4-way split Concenco revolving-feed distributor to handle 0x1¼-in. coal.

M. B. STEWART, Millersburg, Pa.—Contract closed with Deister Concentrator Co. for one "SuperDuty Diagonal-Deck" No. 7 coal-washing table to handle barley coal.

TENNESSEE RIVER COAL CO., Dayton, Tenn.—Contract closed with Deister Concentrator Co. for two "SuperDuty Diagonal-Deck" No. 7 coal-washing tables to handle 0x1½-in. coal.

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Coal Men Aid British Relief

Keen interest is being shown by coal operators and distributors throughout the country in behalf of the British War Relief Society. Many firms and individuals have made substantial contributions in cash. There has been raised thus far a total of more than $10,000,000 in cash by the society, under the presidency of Winthrop W. Aldrich (chairman, Chase National Bank of New York). In addition about $2,500,000 in supplies has been sent abroad. Frederick W. Gehle (also of the Chase National Bank) is director of the Commerce and Industry Division.

Contributions are allocated especially for civilian relief of the homeless and destitute and for the families of men killed in action. The establishment of hostels in the country for bomb-shocked children is one of the

major activities now carried on by the society from its national headquarters at 730 Fifth Ave., New York City. Any readers of *Coal Age* who are interested should address this office or write to the society direct for additional details.

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Seven New Mine Inspectors Named by Rinehart

Seven new district mine inspectors have been named by N. P. Rinehart, chief of the West Virginia Department of Mines, who said they are the first group to be named under a 1941 act authorizing an increase in the department. The additions represent part of a plan to reorganize the State into 41 inspection districts. Until the Legislature acted this year, the department was limited to 25 district inspectors.

The new appointees began their duties on Aug. 19. The men, their home addresses and the districts they will cover are: George McIntyre, Morgantown, Monongalia County; W. L. Kidwell, Whipple, a section around Rainelle; C. E. Jones, Fayetteville, the vicinity of Mount Hope; Jay Philpott, Beckley, the head of Winding Gulf and Piney; Lawrence G. Hurst, Matoaka, Mercer County; Robert J. Marrs, Welch, part of McDowell County; Edward Smith, Crumpler, a section around Iaeger in McDowell County.

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Hecla Mine to Start Soon

Hecla mine, which the West Kentucky Coal Co. is preparing to open about two miles west of Earlington, Ky., is expected to start operations within 30 days, according to an announcement on Aug. 21. The mine will employ about 150 men.

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Industrial Notes

MACWHYTE WIRE ROPE CO., Kenosha, Wis., has elected Robert B. Whyte as vice president in charge of operations. His connection with the wire-rope industry dates back to 1913; he joined the Macwhyte organization four years later.

FOXBORO CO., Foxboro, Mass., has moved its St. Louis office to the Continental Building, 3615 Olive St. E. B. Miller is manager, and R. H. Hemfelt, assistant. E. R. Huckman, formerly manager at St. Louis, has been transferred to the New York territory.

KELLOGG SWITCHBOARD & SUPPLY CO., Chicago, has selected F. G. Gardner, of its engineering staff, to fill the post of acting chief engineer.

PEERLESS PUMP DIVISION of the Food Machinery Corporation has moved its Eastern offices and manufacturing facilities from Massillon, Ohio, to a new and modern plant in Canton, Ohio.

OHMITE MFG. CO., manufacturer of rheostats, resistors, tap switches and chokes, has completed an addition to its factory in Chicago. This is the second expansion within a few years.

E. I. DUPONT DE NEMOURS & CO., INC., has

promoted R. C. Crumbaugh from assistant manager of its Birmingham (Ala.) district office to manager. He succeeds C. J. Perry, who has been made a consultant with special duties.

COPPERWELD DIVISION of the Copperweld Steel Co., Glassport, Pa., has named William J. McIlvane as general manager of sales. He succeeds Robert J. Frank, who resigned as vice-president in charge of sales but will continue as a vice-president and director. Mr. McIlvane was formerly promotion manager of Copperweld.

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Coal-Mine Accident Fatality Rate Slips Farther Downward

Accidents at coal mines of the United States caused the deaths of 80 bituminous and 19 anthracite miners in June last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors. With a production of 43,090,000 net tons, the accident death rate among bituminous miners was 1.86 per million tons, compared with 1.98 in June, 1940.

The anthracite fatality rate from accidents in June last was 3.89, based on an output of 4,886,000 net tons, against 4.12 in the corresponding month a year previous.

For the two industries combined, the accident fatality rate in June last was 2.06, compared with 2.23 in the sixth month of last year.

Fatalities during June last, by causes and states, as well as comparable rates for the first six months of 1940 and 1941, are shown below.

Two Companies Absorbed By Tri-County Fuel

Tri-County Fuel Co., an Ohio corporation, has taken over all of the properties and sales contracts of the two former partnerships Tri-County Sales and Stoker Sales Co. The following personnel will be in charge of operations: M. A. Dunn, president; Ross Ryan, executive vice president; Brooke Anderson, secretary-treasurer; A. W. Neillie, manager of sales, and L. W. Berresford, operating superintendent. Mines to be operated by the new organization are: Chaplow, Negley, Ohio; Farren, West Sunbury, Pa.; Knapper, Slippery Rock, Pa.; McCurdy, Jackson Center, Pa.; Point Marion, Point Marion, Pa.

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Pyramid to Buy Sesser Mine?

Pyramid Coal Corporation has taken over the Sesser (Ill.) mine of the Brewerton Coal Co. for dewatering and inspection. A Pomona deepwell pump has been purchased for dewatering. This unit has 400 g.p.m. capacity at about 600-ft. head and will be driven with a 100-hp. motor. F. A. Lyons is superintendent.

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Trade Literature

INSTRUMENTS — Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Catalog Section 43-330 describes miniature a.c. and d.c. voltmeters and ammeters in the 2-in. classification for general use. Permanent while dials, interchangeability of parts, and high overload capacity are among the features discussed.

UNITED STATES COAL-MINE FATALITIES IN JUNE, 1941, BY CAUSES AND STATES

State	Underground												
	Falls of Roof	Falls of Face	Haulage	Gas or Dust Explosions	Explosives	Electricity	Machinery	Other Causes	Total Underground	Shaft	Open-Cut	Surface	Grand Total
Alabama	1	..	2	5	..	..	..	..	8	..	..	..	8
Illinois	2	1	..	..	1	..	..	1	5	..	..	1	6
Indiana	..	..	..	..	..	..	1	..	1	..	..	..	1
Kentucky	10	..	2	..	..	..	..	..	12	..	..	..	12
Maryland	1	..	..	..	..	..	..	..	1	..	..	..	1
Ohio	1	..	2	..	..	..	..	..	3	..	..	..	3
Penna. (bit.)	7	..	2	6	..	..	..	1	16	..	..	1	17
Tennessee	1	..	1	..	..	..	..	..	2	..	..	..	2
Virginia	2	..	..	..	..	..	..	..	2	..	..	1	3
Washington	1	..	..	..	..	..	..	..	1	..	..	..	1
West Virginia	12	4	7	2	..	..	..	..	25	..	..	1	26
Total bituminous	38	5	16	13	1	..	1	2	76	..	..	4	80
Penn. (anth.)	8	1	2	3	1	1	..	1	17	1	1	..	19
Grand Total	46	6	18	16	2	1	1	3	93	1	1	4	99

DEATHS AND FATALITY RATES AT UNITED STATES COAL MINES, BY CAUSES*

January–June, 1940 and 1941

Cause	Bituminous				Anthracite				Total			
	Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons	
	1940	1941	1940	1941	1940	1941	1940	1941	1940	1941	1940	1941
Underground:												
Falls of roof and coal	270	237	1.230	1.048	55	51	2.199	1.965	325	288	1.329	1.142
Haulage	100	80	.455	.354	22	13	.880	.501	122	93	.499	.369
Gas or dust explosions:												
Local	7	10	.032	.044	2	5	.080	.193	9	15	.037	.059
Major	163	30	.742	.133	...	...	.....	.....	163	30	.666	.119
Explosives	13	10	.059	.044	5	5	.200	.193	18	15	.073	.059
Electricity	12	8	.055	.035	5	2	.200	.077	17	10	.070	.040
Machinery	14	16	.064	.071	1	...	.039	.....	15	16	.061	.064
Shaft	2	2	.009	.009	3	2	.120	.077	5	4	.020	.016
Miscellaneous	14	3	.064	.013	3	6	.120	.231	17	9	.070	.036
Stripping or open-cut	6	13	.027	.057	2	2	.080	.077	8	15	.033	.059
Surface	22	15	.100	.066	5	7	.200	.270	27	22	.110	.087
Grand Total	623	424	2.837	1.874	103	93	4.118	3.584	726	517	2.968	2.050

*All figures subject to revision.

MOTORS — Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin B6052-B concisely describes the company's complete line of Lo-Maintenance motors in ratings from ¾ to 75 hp., inclosed and splashproof types, a.c. and d.c.

Hoisting

WIRE ROPE—Macwhyte Co., Kenosha, Wis. Catalog G-14, increased from 112 to 170 pages and listing more than 1,000 ropes, includes many new additions designed to help rope users. It is sectionalized for quick reference, with a tabbed index and table of contents for each section.

Maintenance

ELECTRIC DRILL—Independent Pneumatic Tool Co., Chicago. Circular JE-112 shows the company's latest Type U14 ¾-in.-capacity small light one-hand electric drill. It also presents complete range of models, motor sizes, speeds and switch styles.

SPRAY PAINTING OUTFITS—DeVilbiss Co., Toledo, Ohio. Bulletin Form F-222 describes two improved series of 4- and 6-hp. portable spray painting air compressing outfits for operation of two- and three-spray guns.

Miscellaneous

FLOW METERS — Cochrane Corporation, Philadelphia, Pa. Publication 3010 is a handbook of instrument application to steam, water, air, gas, and viscous, volatile and corrosive fluid measurement. Considerable space is devoted to the importance of flow records in the efficient operation of boiler and turbine rooms and various process departments. Special sections cover control applications, dual range recorders, detached instruments and summation meters.

METAL SPRAYING—Metallizing Engineering Co., Inc., Long Island City, N. Y. The latest issue of "Metco News" shows how to get along with less priority metal by using the metal spraying process, especially in the production and maintenance of rotating and reciprocating mechanisms.

VIBRATION AND NOISE DISPELLERS—B. F. Goodrich Co., Akron, Ohio. Catalog Section 7900 contains a general discussion of the vibration insulation problem and the part that rubber is playing in its solution, together with methods of selecting the proper Vibro-Insulator mounting, methods of mounting and discussions of uniformity of load distribution, rocking and horizontal motion, and care of the devices.

Preparation

COAL CLEANERS—Roberts & Schaefer Co., Chicago. Bulletin 156 tells advantages of the tandem hydro-separator. Bulletin 157 describes the new Hydrotator. Bulletin 158 cites characteristics of the Stump Air-Flow coal cleaner.

MAGNETIC PULLEYS — Stearns Magnetic Mfg. Co., Milwaukee, Wis. Catalog contains descriptive matter, illustrations, specifications and voluminous data on magnetic pulleys and magnetic-pulley separator units.

Pumps

MOTOR-DRIVEN PUMPS—Fairbanks, Morse & Co., Chicago. Bulletin 6720X is devoted to a new line of horizontal short-coupled base mounted pumps for low-head irrigation service.

Stripping

EXCAVATOR—Harnischfeger Corporation, Milwaukee, Wis. Bulletin describes in interesting detail numerous special features of the P&H Model 150 ½-yd. excavator, including hydraulic control and simple rolled alloy steel attachments that permit easy change-over for shovel, clamshell, crane, dragline, trench hoe, skimmer scoop or piledriver.

EXCAVATOR PARTS—American Brake Shoe & Foundry Co., Chicago Heights, Ill. Bulletin 641-D describes design changes of the Amsco renewable-lip dipper, standard present-day models and special types of dippers, as well as dipper teeth, lips, fronts, backs, doors and other parts designed to meet specific digging conditions. Bulletin 641-S gives details on power-shovel and dragline parts such as dipper stick racks and pinions, boom sheaves, crawler idlers, rollers, tumblers and treads for power shovels; and sheave blocks, bucket lips, tower machine gears, pulling hitches and chains for draglines.

WAGON SCRAPERS—R. G. LeTourneau, Inc., Peoria, Ill. Catalog TP-104 gives facts and illustrations on the Tournapull, Models C and Super C, including specifications. Folder TR-102 describes applications of Tournapulls on all forms of earth moving and construction.

Transportation

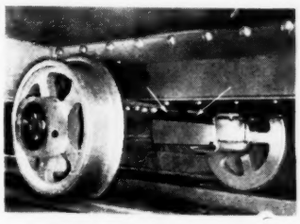
JACKS—Buda Co., Harvey, Ill. Bulletin 1066 contains complete factual data on all types and sizes of Buda jacks, including a table to help in selecting the correct unit for any special job.

WHAT'S NEW IN COAL-MINING EQUIPMENT

NON-SLIP FOOTWEAR; RUBBER SPRINGS

A new type of footwear with patented non-slip sole to avert accidents has been especially designed for the mining industry by the United States Rubber Co., New York City. Known as the Sperry Top-Sider, this sole on the straightaway is perfectly smooth and, being made of pure white rubber, leaves no mark on any surface. In action, thousands of small rubber waves open up to create a squeegee effect. A short line has been introduced which includes an all-white patrol rubber; an all-white Terre Haute, a light, short boot; hip-length boot, and special marine boot.

Development of rubber springs for mine cars is announced by U.S. Rubber. Among advantages claimed are: better spring action, quieter ride, greater dependability, increased economy, and



greater safety. Two types of rubber springs are used: a shear and a compression type.

The shear-type spring carries the load while the car is empty. There are four of these springs in each car. They carry a load of 5,000 lb. Each spring measures $\frac{1}{4}$x3$\frac{5}{16}$x3$\frac{1}{8}$ in.

The compression-type spring carries the total load of car and coal. There also are four of these springs in each car. They carry a total load of 19,000 lb. Each spring measures 4x13x1$\frac{3}{4}$ in.

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CONVEYOR BELT

A new type of conveyor belt called Homocord has been introduced by the Manhattan Rubber Mfg. Division, Passaic, N. J. It is said to combine the extreme flexibility of cord construction with ability to hold metal fasteners to a degree previously approached only by fabric construction and with added qualities which notably increase life and tonnage capacity. The construction employs neither standard weave nor standard cord design; a different type of cord was developed and then new body construction was invented particularly and only to meet the requirements of conveyor belt use.

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COOLBAND

Mine Safety Appliances Co., Pittsburgh, Pa., offers the new M.S.A. Coolband—a modern perspiration retainer for men on hot jobs. This appliance betters hot

working conditions by preventing sweat in the eyes, on goggles or glasses. It stops continual face mopping and other deterrents to continuous work arising from uncontrolled head perspiration.

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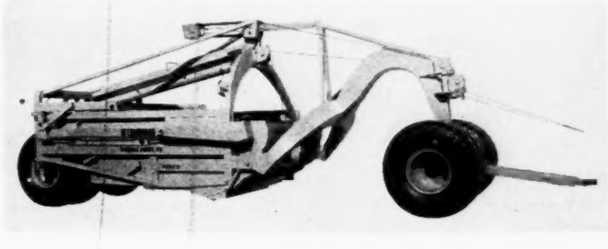
DOUBLE-BUCKET CARRYALL

Designed to give increased yardage with D8 tractor power, R. G. LeTourneau, Inc., Peoria, Ill., has introduced the Model FU carryall cable-controlled scraper, a patented double-bucket unit with a struck capacity of 17.7 and a heaped capacity of 23 cu.yd. The double-bucket feature gives the effect of loading two small carryalls one after the other. The rear bucket telescopes forward and is loaded separately. After the first bucket is loaded to capacity it travels back on rollers and roller bearings instead of being forced back, thus reducing loading resistance and giving larger possible loads for expended tractor effort. The second, or front, section of the bowl is then easily heaped high with the D8 tractor power.

High sides retain the material that would otherwise "boil" over and be lost by downhill or pusher loading. A new apron design increases capacity, reduces overflow and facilitates loading by reducing entrance friction. A gooseneck or swan-neck yoke gives increased clearance for large single or dual tires when working over uneven ground.



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PORTABLE ACETYLENE GENERATOR

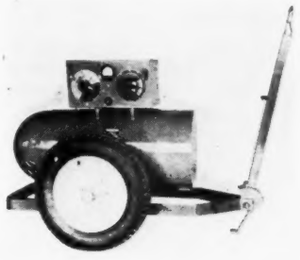
A new portable acetylene generator for use in oxyacetylene welding and cutting is offered by the Linde Air Products Co., New York City. This unit, known as the Oxweld MP-10, will deliver 30 cu.ft. of acetylene per hour and is suitable for welding metal up to $\frac{3}{8}$ in. thick. It is designed for maximum portability from the standpoint of weight and height and can readily be moved about the shop or away from the shop for outside jobs. The generator can be recharged speedily and is simple and easy to operate.

Generation of acetylene is started, set for regular operation, and stopped, by rotating the single pair of operating handles at the top of the generator. Once the operating handles have been set, generation of acetylene proceeds automatically. The pressure of acetylene delivered to the blowpipe is controlled by a regulator which forms an integral part of the generator, and a separate pressure gage indicates at all times the pressure within the generating chamber.

•

WELDING MACHINE TRAILER

A new two-wheeled lightweight pneumatic-tired trailer for mounting arc-welding machines for easy, fast portability in shop, yard or on the road is offered by the Lincoln Electric Co., Cleveland, Ohio. The new unit can be used for road towing up to about 30 miles per hour, can be hitched



to a factory mule or industrial truck and is easily moved by hand by virtue of the low underslung construction, narrow 31-in. tread and method of balancing. It is of arc-welded steel construction throughout. Mounting is readily accomplished by means of four bolts in the frame of the trailer which register with holes in lugs on the welding machine.

•

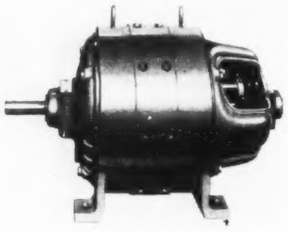
IMPROVED V-BELT, EXCITER

Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces fundamental improvements in V-belt structure. All its Texrope V-belts are now of the new "Super 7" laminated design, based on the Vogt formula and abundant field experience, to include more strength and flexibility, greater service and longer life.

The cords in the new "Super 7" are smaller, permitting the use of more cords per belt, with resulting greater strength and less stretch. Each cord is individually embedded in heat-dissipating rubber to reduce internal belt degeneration. The belts are made in matched sets to assure uniform, smooth-running, highly efficient drives. Each element of the belt is designed to fulfill an individual function. The live-rub-

ber bottom cushion absorbs the ceaseless impacts of operation. The central cord portion transmits power at the effective pitch diameter. The bias-cut fabric prevents "dishing" and assures transverse stability. The two-ply rubber-impregnated fabric cover prevents destructive agents from reaching the vital belt elements, resulting in high grip coefficient between belt and sheave walls.

Efficient quick-response regulation for automatically holding constant output on d.c. and a.c. machines is available with the new "Regulex" exciter developed by Allis-Chalmers. This rotating regulator reduces the first cost of a generator or motor installation because exciter and regulator are



combined in one unit. The Regulex consists of a differential amplifier for controlling excitation on d.c. motors and generators to give constant voltage, current, speed or tension. Applications include mine hoists. Regulex exciters are being developed for all sizes of d.c. machines, and they are applicable to a.c. synchronous motors, generators and condensers.

•

BULLDOZER

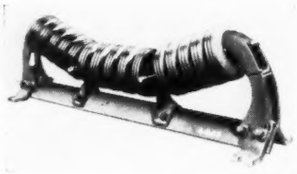
Buckeye Traction Ditcher Co., Findlay, Ohio, has developed the new Buckeye Unitilt cable-controlled bulldozers and trailbuilders for all makes and models of tractors. The patented tilting device and the universality of the frame permit using either Buckeye bulldozer or trailbuilder moldboards on the same frame. One man can change moldboards, which can be dismounted from the tractor by pulling two kingpins. The sidearms and other parts stay in place. The tilting device is located on one sidearm and permits raising or lowering bulldozer or trailbuilder blade at either end a distance of 12 in. Turning one bolt only is all that is required to effect the tilting adjustment.

Other features include: construction of the front cross beam so that the blades hug the radiator, thus reducing the heavy overhanging load on the front of the tractor and reducing wear on front idlers and track rolls; blade curvature which rolls the dirt ahead, reducing "dead" weight and permitting bigger loads in front of the blade; 60-in. lift of blade and unlimited depth of cut below ground level; natural digging action of blade which cuts as deep as operator desires without requiring any mechanical means of creating down pressure; balanced design which prevents tipping of tractor and keeps full length of crawlers on the ground; sidearms mounted at drive axle of tractor; rigid, fully braced members to withstand all types of 'dozing work.

•

CONVEYOR IDLER

A pneumatic roller for carriers on belt conveyors wherever the shocks of impact are excessive has been introduced by the Stephens-Adamson Mfg. Co., Aurora, Ill. These pneumatic carriers are specially designed for use under loading spouts and in belt feeders where the impact of heavy bulk loads subjects both conveyor belt and carrier to abnormal strains and wear. To cushion the impact of materials (and thereby prolong conveyor belt life), the rollers in these carriers are made up of a series of



pneumatic rubber units 6 in. in diameter suggestive of minature automobile tires.

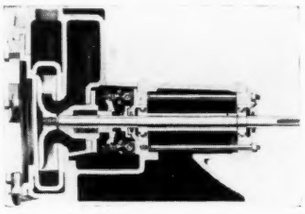
The rollers in these impact carriers—Style No. 711—are mounted on the steel hub in which bearings and shaft are housed. Roller units have thick wear-resisting treads and are inflated and permanently sealed to prevent loss of air. The assembly is built for easy servicing and quick replacement of damaged units.

•

HORIZONTAL PUMP

American Manganese Steel Division of American Brake Shoe & Foundry Co., Chicago Heights, Ill., is now producing Amsco-Nagle horizontal shaft pumps. Designated types A and T, the new units are available in all sizes from ¾ to 6 in. in capacities up to 1,400 g.p.m. and for operating heads up to 100 ft.

A variety of materials is used in the construction of these pumps, the choice depending upon the extent of the abrasion or corrosion under which the pump will operate; including such metals as manganese steel, chromium-nickel alloys, white



iron, nickel-iron, brass, bronze and other cuprous alloys. Four types of impellers are available. These pumps are recommended for handling sludge, slime and slurries.

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OFF-THE-ROAD TIRES

Four major product changes in its line of off-the-road tires for use in hard service are announced by the Goodyear Tire & Rubber Co., Akron, Ohio. The four new tires are: a new Earth-Mover all-weather tread, low-pressure Sure-Grip grader, Hard-Rock lug, and the ML Logger tire.

The Earth-Mover all-weather has a thicker tread upon which are larger non-skid buttons whose design is carried nearly half way down the tire's side wall. The Earth-Mover makes it possible to handle not only sand and soft dirt but also shale and solid-rock blasting with self-loading scrapers. The new tire's flotation, resistance to side slip and ability to clean itself have all been improved by the extra size, extra strength and alignment of its diamond-button design. Button edges have been rounded to reduce snagging and chipping. New design Earth-Movers are available in 14.00-20, 16.00-20, 18.00-24, 21.00-24 and 24.00-32 sizes.

Redesigned to put more effective power behind the grader blade, the low-pressure Sure-Grip grader tire has a disconnected bar-type tread that delivers an extra 50 per cent traction, with no appreciable difference in rolling ability over the previous design. Sizes are: 9.00-24, 12.00-24, 13.00-24, 14.00-20, 10.00-24 and 13.00-20. The new tread greatly improves the tire's traction in reverse, an important factor in some kinds of work for which new attachments to late-model graders have been designed.

With flatter tread, whose bars are 50 per cent wider than on former tires, the new Hard-Rock Lug also has greater protection against cutting and body injury over all its contact surfaces. It is said to be an outstanding tire for strip mines, rock excavation work and other operations where cutting hazards are great.

Continuous rib around the new ML Logger's tread provides smoother operation and increases its ability to give longer mileage on hard-surfaced roads. Made of high-quality low-stretch Supertwist cord with multiple compounding and latest improved double-core beads and tie-in, it is also well suited to service off the highway.

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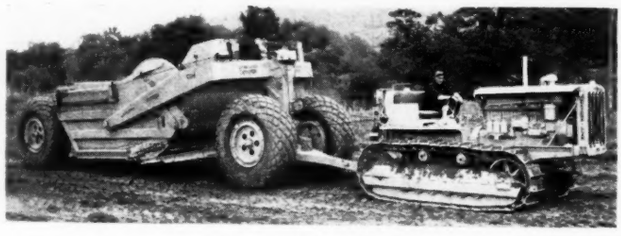
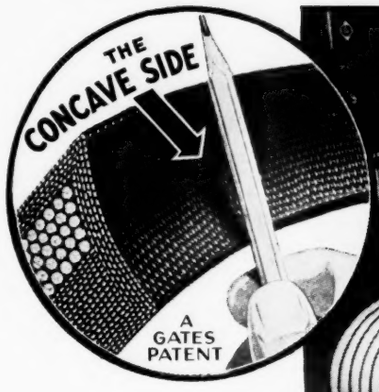
SYNTHETIC PACKINGS, V-BELTING, HOSE

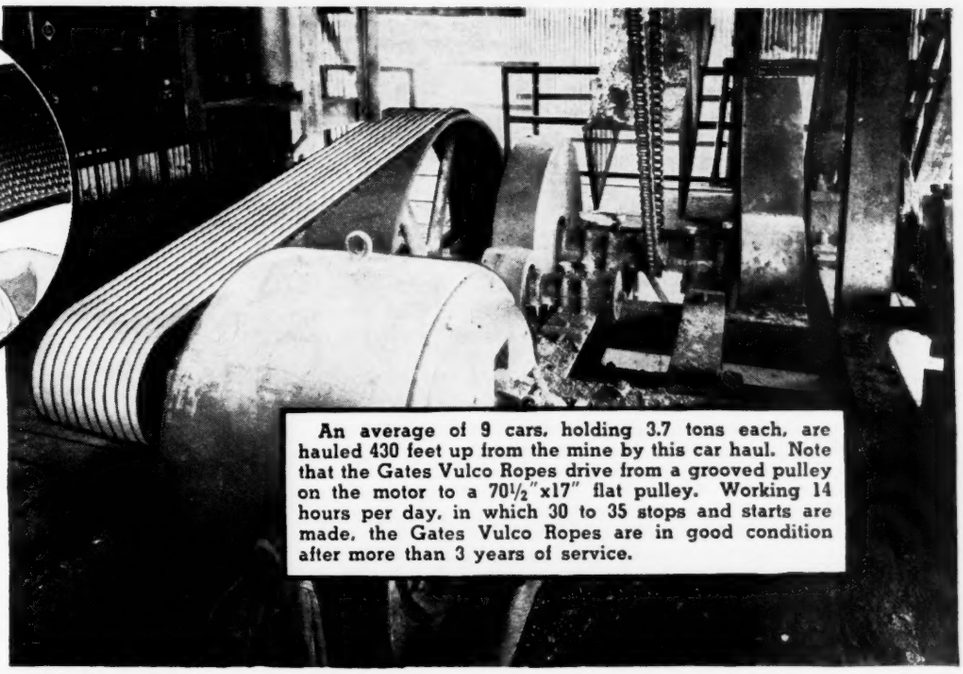
Two new types of packing, one made of Ameripol, its own synthetic rubber, and the other of Koroseal, a synthetic elastic material also created in its laboratories, are offered by the B. F. Goodrich Co., Akron, Ohio. Both are sheet packing.

The Ameripol product is a dark sheet packing showing strong resistance to the action of oils. It ages well and provides excellent resistance to heat and cold as well as water absorption. Tensile strength is about 1,500 lb. per square inch; elongation, 400 per cent; Shore durometer hardness, 78 to 82. Made to order only in 100-lb. rolls, about 36 in. wide, $\frac{1}{32}$ to $\frac{1}{4}$ in. thick, a square yard of the $\frac{1}{16}$-in. size weighs about 4¾ lb.

The Koroseal packing is specially compounded to resist the action of oils and solvents, and also resists the action of some corrosives. Tensile strength is about 2,200 lb. per square inch; elongation, 300 per cent; Shore durometer hardness, 73 to 77. It







An average of 9 cars, holding 3.7 tons each, are hauled 430 feet up from the mine by this car haul. Note that the Gates Vulco Ropes drive from a grooved pulley on the motor to a 70½"x17" flat pulley. Working 14 hours per day, in which 30 to 35 stops and starts are made, the Gates Vulco Ropes are in good condition after more than 3 years of service.

This Simple Test Shows Exactly Why

The Patented

CONCAVE SIDE

substantially cuts your belt costs!

What Happens When a V-Belt Bends

FIG. 1

FIG. 2

To see *for yourself* the money-saving importance of the Concave Side, simply pick up *any* V-belt you have handy and bend the belt as it bends in going around a pulley.

As the belt bends, grip its side-walls between your finger and thumb. You will feel the sides of the belt *change shape*. If the sides were straight before bending, they become *convex* as the belt bends. (See Figure 1 on the left). Note how the sides bulge *out*.

Now look at Figure 2. Here you see how bending changes the shape of a belt with the patented concave side. The side becomes perfectly straight. This belt, when bent, precisely fits the sheave groove. Two big savings result —(1) There is no side-bulge and this means uniform side-wall wear—*longer life!* (2) There is a full side-width grip on the pulley and this carries heavier loads without slippage—saving the belts and also saving your *power!*

The concave side is a Gates patent. Only belts built by Gates are built with the concave side.

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

CHICAGO, ILL. 1524 South Western Ave.
HOBOKEN, N. J. Terminal Building
BIRMINGHAM, ALA. 1631 1st Ave., South
LOS ANGELES, CAL. 2240 E. Washington Blvd.
DENVER, COLO. 999 South Broadway
DALLAS, TEX. 2213 Griffin Street
PORTLAND, ORE. 333 N. W. 5th Avenue
SAN FRANCISCO, CAL. 2700 16th Street

is furnished in 26x26-in. sheets, with $\frac{1}{32}$-, $\frac{1}{16}$-, $\frac{1}{8}$- and $\frac{3}{16}$-in. sheets carried in stock, and other thicknesses made to order.

Goodrich also announces a new line of open-end V-belting for application on drives where endless V-belts cannot be applied or can be put on only at considerable expense and trouble in tearing a machine apart to get at the sheaves. Made in maximum 50-ft. lengths, the open-end V-belting is made in top widths of $\frac{3}{32}$, $\frac{1}{4}$ and $1\frac{1}{4}$ in., and in thicknesses of $\frac{7}{16}$, $\frac{5}{8}$ and $\frac{3}{4}$ in. Angle in each case is 40 deg. Metal fasteners are used.

A new light-weight air hose so flexible that the $\frac{1}{2}$-in. size can be bent to a 3-in. radius without collapsing or cutting off the air supply is offered by Goodrich. The hose has been designed so that strength and efficiency are combined with minimum weight and ease of handling.

Made in light gray, the new hose is stocked in $\frac{1}{2}$- and $\frac{3}{4}$-in. sizes. Of two-braid construction, the hose can easily withstand working pressures of 80–125 lb. Compound of the tube is of oil-resistant rubber with excellent heat-resisting characteristics. The tube does not flake or clog tools. Yarn reinforcement affords a safety factor of more than five to one under a working pressure of 125 lb., while the golden-ply insulation has been especially developed to assist in flexibility and resistance to kinking.

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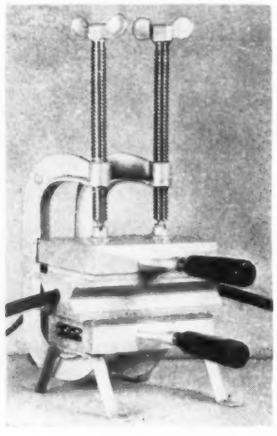
CABLE AND BELT VULCANIZERS

Because of the growing shortage of copper and its higher cost, repair of rubber-covered electrical cables is becoming more common, and for this work the Shaler Co., Waupun, Wis., has improved its industrial vulcanizers for use in replacing rubber-insulation covering where cables are spliced or where insulation has become damaged.

Interchangeable mold blocks to accommodate various size cables are provided. Other models are made for splicing round or flat rubber belts (up to 5-in.), all being electrically heated and furnished with appropriate attaching cord and plug for connection to ordinary 110-120-volt electrical circuits.



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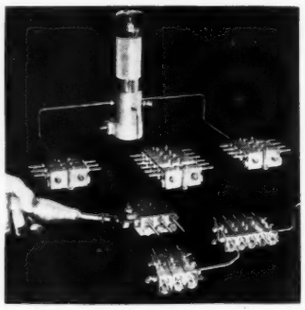
CENTRALIZED LUBRICATION

Trabon Engineering Corporation, Cleveland, Ohio, offers low-cost positive centralized lubrication through development of the Trabon non-reversing single-inlet multi-outlet distributor feeder and the new Series "MP" variable-feed multi-outlet pump.

This improved feeder consists of a bank of three or more sections each of which discharges a known and measured quantity of lubricant alternately through one or two discharge outlets which are direct-connected to bearings. By selecting the proper number and capacity of sections and supplying the proper quantity of lubricant to the inlet, a single distributor discharging progressively through one outlet after another will deliver just the desired quantity of lubricant to all the connected bearings, even though the individual bearings have



widely varying lubricating requirements.

Multi-outlet pumps, designed specially for use with these non-reversing systems, are available in three sizes having different reservoir capacities. They are driven with a worm gear, available in various ratios for use with any chain, gear, V-belt or direct motor connection, or can be furnished with overrunning clutch if the drive is taken from a cam or some oscillating part.

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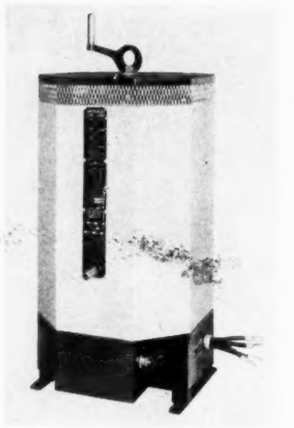
TRANSFORMER ARC WELDER, CRATER ELIMINATOR

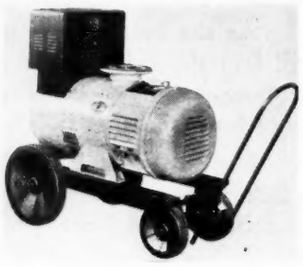
A new line of a.c. transformer welders in 300-, 500-, 750- and 1000-amp. capacities is offered by Wilson Welder & Metals Co., Inc., New York City. Known as Model TW, these are completely self-contained units that will meet heavy arc-welding needs;



for 220, 440 or 550 volts, 25- or 60-cycle current. When arranged for 220- and 440-volt operation, single-phase, either voltage can be brought into use by a reconnection of the leads which are brought outside the unit.

The new welders have a wide range of current output and continuous stepless current regulation is provided over the entire range by means of a hand crank on top of the machine. This crank makes it possible to shift the setting rapidly as changes are made from one class of work to another.

Crater formation in metallic arc welding is known to be caused by abrupt breaking of the welding arc, which does not give the molten metal at the end of the deposit an opportunity to become free of gases and slag. The two outstanding char-



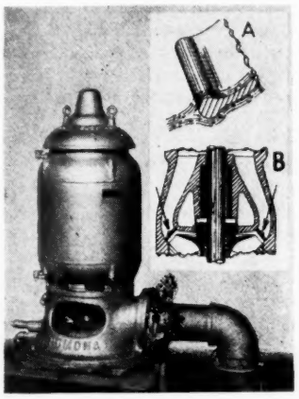
acteristics of the deposited metal in the crater area are porosity and a distinct depression in the contour of the deposit. Wilson company announces the "Stroco" electric arc crater eliminator for use where the presence of the typical crater at the end of a weld deposit is objectionable.

This crater eliminator is an auxiliary device which is mounted on the body of the arc-welding generator. It is connected in series with the excitation field of the generator and controlled by a switch which enables the operator to cut it in and out of the excitation field circuit whenever desired.

VERTICAL TURBINE PUMPS

Pomona Pump Co., St. Louis, Mo., and Pomona, Calif., announces design improvements which eliminate hydraulic losses in pumps. These improvements, included in all sizes of Pomona vertical turbine pumps, involve fundamental changes in guide vanes, the function of which is to alter from horizontal to vertical the flow direction of fluids being pumped.

The improvement is inherent in the pump design, so that there are no gadgets or small parts to wear out. The new vane increases over-all operating efficiency as much as 10 per cent, with no increase in the original investment, and in addition permits the high efficiency to be maintained over a broad range of



capacities. Moreover, the broader guide vanes give increased strength because of their extra thickness. The owner of a vertical turbine pump need not purchase a complete new pump in order to take advantage of the new design. It is only necessary to substitute a new bowl assembly.

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MOTOR PULLEY, BRAZER, ARC WELDER

Ideal Commutator Dresser Co., Sycamore, Ill., announces a new variable-speed pulley designed for light, inexpensive machinery. The pulley mounts directly on the motor shaft and requires only standard V-belts. Features include short overhang, forced lubrication, balanced sheave and all-metal construction. Both halves of the sheave move, giving accurate belt alignment at all times. The pulley faces are curved, so that the belt has full contact at all pitch diameters. Speed ratios up to $2\frac{3}{4}$ to 1 are available; sizes up to $\frac{3}{4}$ hp.

The complete unit includes variable-pitch pulley and adjustable sliding motor base. By turning the handwheel of the base, the motor moves backward or forward, causing an increase

or decrease in belt tension. This causes the pulley to open and close, changing the pitch diameter and the driven speeds. Speed changes are made while the drive is running.

A new electric brazer for brazing and soldering with silver solder is offered by the Ideal Company. It consists of a power unit or transformer and a pair of electric heating pliers. Holding the part to be brazed in the pliers closes the secondary circuit, causing the part to heat quickly to brazing temperature. Heat is accurately controlled by an On-Off foot switch. When in use the cover turns back, making a convenient shelf for flux, silver solder, etc. Compartments are provided for heating pliers, foot switch, silver solder and flux. When not in use all parts can be inclosed and out of the way in the streamlined cabinet, which is readily portable on easy-rolling casters.

Simplified welding is claimed as the outstanding feature of a new a.c. electric arc welder offered by Ideal. The design includes a reactance winding on a separate core in addition to the transformer. This reactance acts as a stabilizer, making it easy to strike an arc and hold it. As the distance between the end of the welding rod varies, this reactance winding causes the voltage to vary proportionately, so that the arc always is smooth.

Fifteen different welding heats between 20 and 175 amp. give accurate heat and penetration control for each individual job and different parts of the same job. Penetration may be up to ¾ in. or more if desired. These heats are at two voltages—45 and 70 volts. The standard welder is for 230-volt 60-cycle operation. Size welding rod recommended is 1/16 to 5/32 in. Primary current, 1.75 amp. no load, 52 amp. full load; over-all dimensions, 17x15x26 in. high; weight, 190 lb. Accessories available with the Weld-Master include ground lead, electrode lead, electrode holder, welding rod, primary cord and plug.

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WAGON DRILLS

Chicago Pneumatic Tool Co., New York City, offers the new G-500 wagon drills, designed for deep-hole drilling and said to be particularly adapted to stripping operations. Advantages claimed are quick portability, gravity feed and air (or hand) hoist, adjustable tilting tower, and exceptional drilling speed. A mounting slide is provided with four removable weights for regulating feed pressure to formation. A drill-steel centralizer facilitates starting of holes and takes the whip out of

long steels. A hand hoist, extension guide and steel rack are provided for readily handling steel.

•

ELECTRIC EQUIPMENT

For use with polyphase wound-rotor motors on fan, pump and similar drives, a new motor-operated secondary controller is offered by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. This SC controller provides either 13 or 20 balanced points of control by varying the external resistance in the motor secondary winding. Inclosed in a self-supporting steel cabinet, the unit has cam-actuated contactors arranged for sequential operation in pairs from a common motor-driven camshaft. Individual cams give "quick-make" and "quick-break" contact action. Pure silver inlays on contact surfaces are said to assure excellent current conductivity and avoid heating due to oxidation of the copper base. Separate copper arcing contacts prevent burning or pitting of main contact surfaces.

The controller drive mechanism consists of a pilot motor, a gear reduction unit, and a Geneva gear for angular movement of the camshaft. Step-by-step action is assured by a gear and pinion arrangement to move the controller one full position or point for each gear revolution. Over-travel protection is provided by auxiliary cam-actuated switches. The motor may be supplied for 115 or 230 volts d.c. and 110, 220 or 440 volts a.c.

Optional features such as remote position indication, follow-up attachment and time-delay operation can be provided.

High interrupting capacity and reduced mounting space are featured in the new non-automatic inclosed "De-ion" circuit interrupter announced by Westinghouse. Known as the N.E.M.A. Type 1A, this sheet-steel dust-resisting unit is designed to replace non-automatic disconnecting devices used in locations where inclosed unfused safety switches might be applied.

These two- or three-pole interrupters have 50- to 600-amp. ratings on 250- to 600-volt a.c. and 125/250- and 250-volt d.c. lines. Rust- and corrosion-resisting metals are used in all units, and all main contacts are of non-welding silver or special silver composition. De-ion arc quenchers are used to reduce contact burning and preserve the contacts. Safety features include a cover interlock which prevents closing of contacts when cover is open, and opening of cover when interrupter is in the "ON" position.

For use on any normal-duty application that would otherwise require fuses or fused switches, a new low-cost multi-breaker is announced by Westinghouse. Available in two types, M-1 and M-2, these 15- to 100-amp. two- or three-pole breakers are for use on a.c. circuits up to 230 volts. The sheet-steel inclosure is dust-resisting (N.E.M.A. Type 1-A) with ten concentric knockouts for conduits or cable connections.

In operating, a bimetal thermal element is actuated by overload or short circuit and causes the breaker to trip. However, while the breaker trips immediately on short circuit or dangerous overload, an inverse-time characteristic allows it to remain closed during temporary harmless overloads. An indicating target on the inclosure cover shows when multi-breaker has tripped.

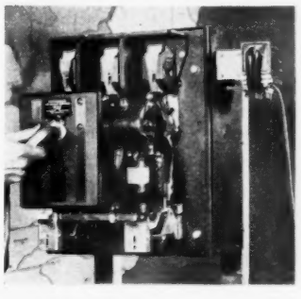
Remote and automatic control for mining equipment such as conveyors, pumps, fans, etc., are provided in the new d.c. combination starter announced by Westinghouse. Automatic starting and acceleration are accomplished from a built-in or remotely mounted pushbutton. Safety features include a line disconnecting switch, low voltage protection, combination thermal, instantaneous overload protection, and safety interlocks to prevent opening the door unless the switch is off.

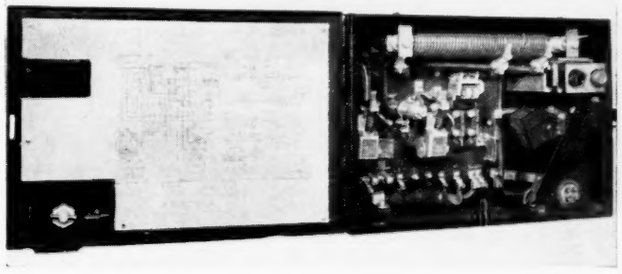
When the disconnecting switch is closed and the start button pushed, the line contactor closes, starting the motor with resistance in the circuit. The coil of the accelerating contactor is connected across the motor armature. As the motor accelerates, the voltage across the armature increases and causes the accelerating contactor to close at the proper time. This short-circuits the resistor and connects the motor across the line. When an accurate definite motor speed is desired, a small adjustable field rheostat may be added which provides up to 15 per cent increase in speed.

Designed especially for mining service to furnish low-cost means of starting and stopping, a new d.c. semi-magnetic motor starter is announced by Westinghouse. For use on motors, driving pumps and compressors, these 1- to 15-hp. starters also provide overload and circuit protection on 230-550-volt d.c. lines. The starter consists of a sheet-steel inclosure containing one single-pole 600-volt 60-amp. front-operated "quick-make" and "quick-break" De-ion switch, a small ebony asbestos panel, an accelerating contactor and a resistor.

In operating, when the switch is closed the motor is started with a resistor in series with the armature to limit the starting current. The accelerating contactor coil is connected across the motor armature. As the motor accelerates, the voltage across the armature increases and causes the accelerating contactor to close at the proper time, short-circuiting the resistor and connecting the motor across the line.

A new and compact circuit breaker is announced by Westinghouse. The new type, DK, is

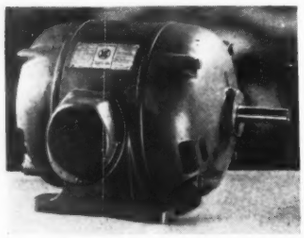




available in 15,000- and 25,000-amp. interrupting capacities in all standard current ratings from 15 to 600 amp. for operation on one-, two-, three- or four-pole 600-volt a.c. or 250-volt d.c. circuits. The new breakers are equipped with a rotary-type removable operating

handle for controlling the breaker manually. In addition electric operation can be provided by a motor mechanism and a shunt trip. The motor-operating mechanism is a single inclosed unit in itself. It can be removed by taking out only three bolts. Main contacts are of silver alloy and employ a self-wiping action. "De-ion" arc quenchers minimize burning on the main and the arcing contacts. These breakers are available in four different forms: an open type and three forms for inclosed applications.

Westinghouse also offers new smaller a.c. squirrel-cage ball-bearing induction motors especially designed for general-purpose industrial machinery-drive applications. These new CS mo-



tors are available in ratings from ½ to 5 hp., with speeds from 875 to 3600 r.p.m., for operation on 110, 220, 440 and 550 volts, 2- and 3-phase a.c.

Greatest of the many improvements incorporated in these motors is the new "permanently sealed" ball-bearing which requires lubrication only once every three years. Double-row bearing width gives 50 per cent greater shaft contact area, with consequent longer bearing life and reduced shaft wear. New specially developed plastic wire coating gives maximum dielectric strength and flexibility. Reinforced cuffs at slot edges protect windings from abrasion, and coil ends are taped to brace them against the strains of full-voltage starting.

Rigid one-piece cast frame assures a stiff support for the rotor and over-all structural rigidity. Smaller in some ratings, the new ball-bearing motors meet the latest revised N.E.M.A. motor standards which became effective Oct. 1, 1940. They are dynamically balanced and each undergoes a radio frequency high-voltage winding test.

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NEW TYPE RUBBER HOSE

Manhattan Rubber Mfg. Division, Passaic, N. J., has introduced Condor Homo-Flex hose, which is said to combine balance, homogeneity and flexibility to a high degree. Among advantages claimed for this hose are: extreme flexibility, lightness in weight, ease of handling, inseparable covers and plies, uniform diameters, and less elongation and expansion. It is manufactured in 50-ft. lengths on accurate steel mandrels in several types that cover a wide variety of service.

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INDUSTRIAL MULTI-BREAKER

A new 230-volt industrial multi-breaker—at little more than the cost of a Type A switch—is offered by Cutler-Hammer, Inc., Milwaukee, Wis. This new unit is said to afford exceptionally economical application as a motor circuit switch or service disconnect switch. It is fuseless, with bimetallic strip actuation, visible trip indication, and trip-free lever. It is quick make and quick break, with a rated capacity of 230 volts from 15 to 100 amp., available in 3-pole, 3-pole solid neutral, or 4-pole solid neutral

types. Calibration is set at the factory and cannot be tampered with. The breaker is completely inclosed and semi-dust-tight. Front access and operation make this breaker convenient, compact and economical of space.

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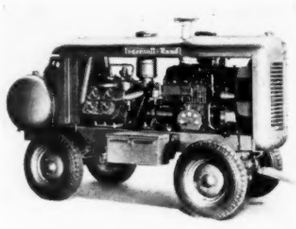
PORTABLE AIR COMPRESSOR; JACKHAMMER DRILL

Ingersoll-Rand Co., Phillipsburg, N. J., offers a new line of portable air compressors which are said to reduce average fuel costs up to 40 per cent compared to previous I-R models. These new machines are distinctive in appearance with copper-colored body and blue wheels, and carry a new trade name, "Mobil-Air."

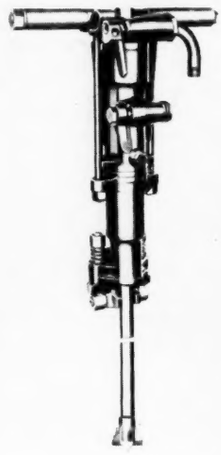
The K series Mobil-Air units have engines convertible from gasoline to oil or from oil to gasoline operation by making a simple substitution of fuel accessories and without changing heads or pistons. With this feature a user can convert his unit and take full advantage of the lowest fuel cost prevailing in the particular area where he is operating.

The patented Drill-More multi-speed regulator automatically ad-



justs the engine speed to the use of air and practically eliminates wasteful idling while air is being used. This device automatically selects the slowest and most efficient of three working speeds to deliver the required capacity.

Ingersoll-Rand also has just introduced a new 55-lb. jackhammer rock drill designated as the "Easy-Holding" JB-5. One reason for reduced vibration is a refined



value action, which results in more economical use of compressed air. An easy-opening, long-life steel holder greatly reduces time and effort in changing drill steels. This holder is either hand- or foot-operated, eliminating bending over.

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RUBBER-TREAD IDLER, BEARING

Development and manufacture of a new line of rubber-tread idlers for supporting the return run of 14- to 60-in.-wide belt conveyors is announced by Link-Belt Co., Indianapolis, Ind. Each complete idler consists of from four to twelve 6-in.-diameter rubber-tired rolls suitably spaced and mounted on a Friction Fighter roller-bearing-equipped steel tube that will fit into the same supporting hangers as the regular Link-Belt idler roll.

The individual rolls consist of a renewable extruded rubber tire clamped between two steel disks firmly held together by three round-head bolts. As the rubber tire is made split, it can be readily replaced with a new tire, when required, by just removing three nuts. The new idlers are especially recommended for conveyors handling corrosive, abrasive, wet or sticky materials such as coke, wet coal, etc., because (1) there is only rubber-to-rubber contact between return idler and the underside of conveyor belt, and (2) as the kneading action of the rubber treads keeps the material from building up, also helping to break up and loosen ice forming on the belt in freezing weather.

A new streamlined babbitted-bearing common flat box (Series 2-1,200) with maroon-colored crackle-finish housing is offered by Link-Belt Co., Chicago. Designed for moderate speed and power requirements, it is available from stock in 24 sizes, for shafts of ½ to 3 in. diameter.

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POWER-CONTROL UNITS

A complete line of single- and two-drum power-control winches for operating cable-controlled equipment with International TracTracTors and other tractors is announced by Bucyrus-Erie Co., South Milwaukee, Wis. Clutch and brake drums are separate and each drum has but one heat-generating surface; bands are external and contact 93.8 per cent of the full circumference of the drum, spreading friction pressures over a large area so that less heat is generated at any one spot.

All bands and drum friction surfaces are exposed to open air to assure prompt heat dissipation. The wide, large-diameter external clutch and brake bands are interchangeable. One handy-to-reach adjustment on each band, in full view of the operator, compensates for wear. Bands are easily replaced in the field with ordinary tools, and without disturbing a single oil seal or bearing.

* This cut inadvertently got into the July issue, p. 102, where it didn't belong.